

**REGION II RST 2 HEALTH AND SAFETY PLAN  
EMERGENCY RESPONSE/REMEDIAL ASSESSMENT/REMOVAL ACTION  
(Revised 16 March 2011)**

**TDD No.: TO-0027-0063**

**Site Name: Unimatic Manufacturing Corporation**

**Site Address: 25 Sherwood Lane**

**City: Fairfield**

**County/State: Essex, New Jersey 07004**

**Driving Directions:**

- 1. Head west toward King Georges Rd/King Georges Post Road**
- 2. Turn right onto King Georges Rd/King Georges Post Road**
- 3. Slight turn onto the ramp to Garden State Pkwy N**
- 4. Keep left at the fork, follow signs for Garden State Pkwy N and merge onto Garden State Pkwy N (Partial toll road) 24.9 miles**
- 5. Take exit 153B on the left to merge onto NJ-3 W toward US-46 W**
- 6. Exit onto US-46 W**
- 7. Take the 2 Bridges Rd exit toward Passaic Ave/The Caldwells/Lincoln Park**
- 8. Turn left onto 2 Bridges Rd**
- 9. Continue on Passaic Ave**
- 10. Turn left onto Sherwood Ln**

**Estimated Travel Time: 52 minutes, Distance: 39.4 miles**







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### Historical/Current Site Information:

The Unimatic Manufacturing Corporation Site (the site) is located in an industrial area at the eastern end of Sherwood Lane in Fairfield, New Jersey. The Site contains a building and a partially paved parking lot. The building was constructed in 1955 on undeveloped land. The Site has other commercial structures to the north, west, south, and east and there is a buried delivery



built to function as a tool shop and then became an aluminum die casting manufacturing business using polychlorinated biphenyl (PCB)-laden lubricants from 1955 to 2001.

GZA Geo-Environmental, Inc. was retained to conduct initial investigation and remedial work on behalf of the Site owner. The initial investigation by GZA which began in May 2001 revealed the presence of a wastewater pipeline on the northeast area of the Site and filled materials in the unpaved portion of the Site north of the building. The soil sample collected from a test pit that was installed near the wastewater pipe contained total target PCBs at concentrations above the New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Cleanup Criteria (RDCSCC) of 0.49 milligrams per kilogram (mg/kg). The sample also contained antimony and copper, two targeted priority pollutant (PP) metals, at concentrations above the RDCSCC. Also the hand auger sample collected from the northern terminus of the wastewater pipe exceeded the NJDEP standard for total organics of 10,000 mg/kg. No other targeted compounds were detected above their RDCSSC in the sample or any of the other test pit soil samples.

During the sampling event that took place on February 7, 2005, GZA collected 11 wipe samples throughout the Site building. All wipe samples contained PCBs at concentrations above the U.S. Environmental Protection Agency (EPA) surface PCB cleanup standard of 0.01 milligrams per 100 square centimeters (mg/100cm<sup>2</sup>). The samples collected in the warehouse contained PCBs at concentrations at least one to three orders of magnitude greater than those collected in the other rooms throughout the Site Building.

During this event GZA also collected eleven chip samples throughout the Site building. Eight out of the eleven chip samples collected contained PCBs. The samples collected at the warehouse had concentrations of PCBs at least one to two orders of magnitude greater than those collected in other rooms throughout the Site building (50 mg/kg).

After obtaining the results from the sampling event on February 7, 2005, GZA went back to the Site building on March 16, 2005 to delineate the surface contamination detected during the February 2005 sampling event. A total of 25 wipe samples were collected and all wipe samples contained PCBs at concentrations above the 0.01 mg/100cm<sup>2</sup> standard.

During the March 16, 2005 event GZA also delineated the chips samples collected that exceeded the concentrations limits of PCBs during the February 7, 2005 event. Ten chip samples were collected during the event. Four of the ten chips collected exceeded the concentration limit of 50 mg/kg. One of the chip samples from the pressing room and three chip samples from the warehouse. The three chip samples from the warehouse exceeded the PCB concentration limit at least one to two orders of magnitude compared to the other rooms in the Site building.

In January 2007, a request for a Revised Remedial Investigation Workplan (RRIW) was requested from the Site owner for an ongoing issue with contaminated soil. PCB contaminated soil exceeded the Soil Remediation Standards and as of 2009 was still present in soils below the water table and in groundwater on the property.

GZA has been conducting remedial work on the Site and submitting RIR/RAW to the NJDEP on behalf of the Site owner ever since. PCB contamination of soil and water are well documented on the Site and contamination has extended off site.



On February 2011, with the submission of the RIR/RAW documentation, GZA Geo-Environmental, Inc. on behalf of Unimatic also submitted an "Opt In" form to move this case to into the License Site Remediation (LSRP) program at the NJDEP.

In September 2012, Weston Solutions, Inc., Removal Support Team 2 (RST 2) mobilized to the Site to conduct soil sampling activities as part of the EPA Removal Assessment of the Site. As part of the sampling event, RST 2 collected a total of 34 soil samples, including one field duplicate, from exterior locations throughout the Site. Analytical results of the soil samples indicated the presence of PCBs ranging from non-detect to 56,000 micrograms per kilogram (ug/kg).

#### **RST 2 Scope of Work:**

As part of the second phase of the EPA Removal Assessment, RST 2 is tasked with providing four to five members for the collection of air samples (one sample per room in the on-site building), chip samples (floors and walls), wipe samples (fans, walls, floors and trusses), material samples (wood, cardboard, forklifts, tires, shoes, vehicle floor mats, etc.) and MicroVac samples. Chip and wipes samples will be submitted to a Contract Laboratory Program (CLP) laboratory (KAP Technologies, Inc.) for target compound list (TCL) polychlorinated biphenyl (PCB) analysis. In addition, one rinsate blank per day will be collected from non-dedicated sampling equipment which will also be submitted for TCL PCB analysis. Material, MicroVac and air samples will be submitted to a private lab (ALS Environmental) for TCL PCB analysis.

#### **Three (3) S.M.A.R.T. Health and Safety Goals for the Project (Simple, Measurable, Actionable, Reasonable, & Timely):**

1. Safe navigation (no accidents) while in vehicle during mobilization to the Site.
2. Safe sampling procedures used during sample collection activities.
3. Safe use of the manlift to be used during the collection of elevated samples.

#### **Incident Type:**

- ☐ Emergency Response
- ☒ Removal Assessment
- ☐ Removal Action
- ☐ Residential Sampling/Investigation
- ☐ PRP Oversight
- ☐ Other

#### **Location Class:**

- ☒ Industrial
- ☒ Commercial
- ☒ Urban/Residential
- ☐ Rural



U.S. EPA OSC: David Rosoff  
Original HASP: Yes or No No, Rev. 1  
Lead RST 2: Lionel Montanez

Date of Initial Site Activities: 10/15/2012  
Site Health & Safety Coordinator: Lionel Montanez  
Site Health & Safety Alternate: Peter Lisichenko

**Response Activities/Dates of Response (fill in as applicable)**

**Emergency Response:**

- ☐ Perimeter Recon -
- ☐ Site Entry -
- ☐ Visual Documentation -
- ☐ Multi-Media Sampling -
- ☐ Decontamination -

**Removal Assessment:**

- ☒ Perimeter Recon - 10/15/2012 through 10/19/2012
- ☒ Site Entry - 10/15/2012 through 10/19/2012
- ☒ Visual Documentation - 10/15/2012 through 10/19/2012
- ☒ Multi-Media Sampling - 10/15/2012 through 10/19/2012
- ☒ Decontamination - 10/15/2012 through 10/19/2012

**Removal Action:**

- ☐ Perimeter Recon -
- ☐ Site Entry -
- ☐ Visual Documentation -
- ☐ Multi-Media Sampling -
- ☐ Decontamination -



### Physical Safety Hazards to Personnel:

<input checked="" type="checkbox"/>	Inclement Weather – Attach FLD02	<input type="checkbox"/>	Heat – Attach FLD05	<input checked="" type="checkbox"/>	Cold – Attach FLD06
<input type="checkbox"/>	Confined Space – Attach FLD08	<input type="checkbox"/>	Industrial Trucks – Attach FLD09	<input type="checkbox"/>	Manual Lifting – Attach FLD10
<input type="checkbox"/>	Terrain – Attach FLD11	<input type="checkbox"/>	Structural Integrity – Attach FLD13	<input type="checkbox"/>	Site Security – Attach FLD14
<input type="checkbox"/>	Pressurized Containers, Systems – Attach FLD16	<input type="checkbox"/>	Use of Boats – Attach FLD18	<input type="checkbox"/>	Waterways – Attach FLD19
<input type="checkbox"/>	Explosives – Attach FLD21	<input type="checkbox"/>	Heavy Equipment – Attach FLD22	<input checked="" type="checkbox"/>	Aerial Lifts and Manlifts – Attach FLD24
<input checked="" type="checkbox"/>	Elevated Surfaces and Fall Protection – Attach FLD25	<input checked="" type="checkbox"/>	Ladders – Attach FLD26	<input type="checkbox"/>	Excavations/Trenching – Attach FLD28
<input type="checkbox"/>	Fire Prevention – Attach FLD31	<input type="checkbox"/>	Demolition – Attach FLD33	<input type="checkbox"/>	Underground/Overhead Utilities – Attach FLD34
<input checked="" type="checkbox"/>	Hand and Power Tools – Attach FLD38	<input type="checkbox"/>	Illumination – Attach FLD39	<input type="checkbox"/>	Storage Tanks – Attach FLD40
<input type="checkbox"/>	Lead Exposure – Attach FLD46	<input checked="" type="checkbox"/>	Sample Storage – Attach FLD49	<input type="checkbox"/>	Cadmium Exposure – Attach FLD50
<input type="checkbox"/>	Asbestos Exposure – Attach FLD52	<input type="checkbox"/>	Hexavalent Chromium Exposure – Attach FLD 53	<input type="checkbox"/>	Benzene Exposure – Attach FLD 54
<input type="checkbox"/>	Drilling Safety – Attach FLD56	<input type="checkbox"/>	Drum Handling – Attach FLD58	<input type="checkbox"/>	Gasoline Contaminant Exposure – Attach FLD61
<input type="checkbox"/>	Noise – Attach CECHSP, Section 7	<input checked="" type="checkbox"/>	Walking/Working Surfaces	<input type="checkbox"/>	Oxygen Deficiency
<input type="checkbox"/>	Unknowns in Tanks or Drums	<input type="checkbox"/>	Nonionizing Radiation	<input type="checkbox"/>	Ionizing Radiation

### Biological Hazards to Personnel:

- |   |   |
|---|---|
| <input type="checkbox"/> Infectious/Medical/Hospital Waste – Attach FLD 44 and 45 | <input type="checkbox"/> Non-domesticated Animals – Attach RST 2 FLD43A     |
| <input type="checkbox"/> Insects – Attach RST 2 FLD 43B                           | <input type="checkbox"/> Poisonous Plants/Vegetation – Attach RST 2 FLD 43D |
| <input type="checkbox"/> Raw Sewage   | <input type="checkbox"/> Bloodborne Pathogens – Attach FLD 44 and 45        |



### Training Requirements:

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> 40-Hour HAZWOPER Training with three days supervised experience | <input type="checkbox"/> 8-Hour Management or Supervisor Training in addition to basic training course |
| <input checked="" type="checkbox"/> 8-Hour Annual Refresher Health and Safety Training              | <input type="checkbox"/> Site Specific Health and Safety Training                                      |
| <input type="checkbox"/> DOT (CMV Training - ERV in Use)  | <input type="checkbox"/> Bio-Medical Collection and Response   |

### Medical Surveillance Requirements:

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Baseline initial physical examination with physician certification | <input checked="" type="checkbox"/> Annual medical examination with physician certification |
| <input type="checkbox"/> Site-specific medical monitoring protocol (Radiation, Heavy Metals)           | <input type="checkbox"/> Asbestos worker medical protocol                                   |

### Vehicle Use Assessment and Selection:

Driving is one of the most hazardous and frequent activities for Weston Employees. As such, Weston Employees are required to adhere to established safe operating practices in order to maintain their eligibility to drive Weston owned, leased, or rented vehicles. Every person riding in a Weston vehicle, including passengers must maintain a commitment for a safe journey. This means being attentive while in the vehicle and helping the driver to notice hazards ahead of and around the vehicle and ensure that their presence does not distract the driver from safely operating the vehicle.

A high percentage of vehicle accidents occur when operating in reverse. Anytime a vehicle is operated in reverse, e.g., backing out of a parking area, if there are passengers, at least one of them are to assist the driver by acting as a guide person during the reverse movement or during other vehicle operation where it would be prudent to have a guide person(s) participate in the vehicle movement. When practical, the preferred parking method would be to back into the parking area.

At a minimum, each Weston Driver must:

- Possess a current, valid drivers' license
- Current Commercial Motor Vehicle (CMV) card when operating the Emergency Response Vehicle
- Obey posted speed limits and traffic laws
- Wear seat belts at all times while the vehicle is in operation
- Conduct a 360 degree inspection around the vehicle before attempting to drive the vehicle
- Report accidents / incidents immediately and complete a Notice of Incident (NOI)
- Keep vehicles on approved roadways (4WD doesn't guarantee mobility on unapproved surfaces)



All Region II RST 2 personnel are experienced and qualified to drive RST 2 fleet vehicles (Tahoe, Suburbans, Minivan/Cargo Van, and Emergency Response Vehicle). However, in the event that vehicle rental is required, each person must take the time to familiarize themselves with that particular vehicle. This familiarization includes adjustment of the dashboard knobs/controls, mirrors, steering wheel, seats, and a 360 degree external inspection of the vehicle.

1. The following vehicles are anticipated to be used on this project:

- |  |  |
|--|--|
| <input type="checkbox"/> Car   | <input type="checkbox"/> Pickup Truck  |
| <input checked="" type="checkbox"/> Intermediate/Standard SUV<br>(e.g. Chevy Trailblazer, Chevy Tahoe, Ford Explorer, Ford Escape) | <input type="checkbox"/> Full Size SUV (e.g. Chevy Suburban, Ford Expedition, GMC Yukon) |
| <input checked="" type="checkbox"/> Minivan/Cargo Van (e.g. Chevy Uplander, Chevy Express Van)                                     | <input type="checkbox"/> Box Truck (Size: approx. 12 feet)                               |
| <input type="checkbox"/> Emergency Response Vehicle (ERV)  | <input type="checkbox"/> Other _____   |

2. Are there any on-site considerations that should be noted:

- |  |   |  |                                       |
|--|---|--|---------------------------------------|
| <input checked="" type="checkbox"/> Working/Driving Surfaces | <input checked="" type="checkbox"/> Debris                  | <input type="checkbox"/> Overhead Clearance              | <input type="checkbox"/> Obstructions |
| <input checked="" type="checkbox"/> Tire Puncture Hazards    | <input type="checkbox"/> Vegetation                         | <input checked="" type="checkbox"/> Terrain              | <input type="checkbox"/> Parking      |
| <input type="checkbox"/> Congestion                          | <input checked="" type="checkbox"/> Site Entry/Exit Hazards | <input checked="" type="checkbox"/> Local Traffic Volume | <input type="checkbox"/> Security     |
| <input type="checkbox"/> Heavy Equipment                     | <input type="checkbox"/> Time/Length of Work Day            | <input type="checkbox"/> Other:                          |                                       |

Do any of the considerations above require further explanation: Will be heavy traffic during long work day commutes. Extra precaution should be used and use of spotters.

3. Was the WESTON Environmental Risk Management Tool completed in EHS? Yes

Was an Environmental Compliance Plan required? No

4. Are there any seasonal considerations that should be noted (e.g., Anticipated Snowy Conditions): No

5. Is a Traffic Control Plan required? ☐ Yes ☒ No



## Chemical Hazards to Personnel

Physical Parameters	Chemical Contaminant Polychlorinated biphenyls (PCBs – Aroclor 1254)	Chemical Contaminant Hexane
Exposure Limits /	_____ ppm <u>0.5</u> mg/m <sup>3</sup> PEL	<u>500</u> ppm _____ mg/m <sup>3</sup> PEL
	_____ ppm <u>0.001</u> mg/m <sup>3</sup> TLV / REL	<u>50</u> ppm _____ mg/m <sup>3</sup> TLV / REL
IDLH Level	_____ ppm <u>5</u> mg/m <sup>3</sup> IDLH	<u>1100</u> ppm _____ mg/m <sup>3</sup> IDLH
Physical Form (Solid/Liquid/Gas) Color	_____ Solid <u>Viscous, oily</u> Liquid _____ Gas <u>Colorless to pale yellow</u> Color	_____ Solid <u>clear liquid</u> Liquid _____ Gas <u>Colorless</u> Color
Odor	Mild hydrocarbon odor	Light Odor
Flash Point Flammable Limits	<u>N/A</u> Degrees F or C <u>N/A</u> % UEL <u>N/A</u> % LEL	<u>-23</u> Degrees F or <u>C</u> <u>7.7</u> % UEL <u>1.2</u> % LEL
Specific Gravity	<u>1.38</u> Water = 1	<u>0.66</u> Water = 1
Solubility	Insoluble in water	Soluble in Water
Incompatible Materials	Strong oxidizers	N/A
Routes of Exposure	<u>  x  </u> Inh <u>  x  </u> Abs <u>  x  </u> Con <u>  x  </u> Ing	<u>  x  </u> Inh <u>  x  </u> Abs <u>  x  </u> Con <u>  x  </u> Ing
Symptoms of Acute Exposure	Irritation eyes, chloracne; liver damage; reproductive effects [ <b>potential occupational carcinogen</b> ]	Irritation eyes, lightheadedness, nausea, headache, and blurred vision [ <b>potential occupational carcinogen</b> ]
First Aid Treatment	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
Ionization Potential	<u>  N/A  </u> eV	<u>  N/A  </u> eV
Instruments for Detection	<u>  </u> PID w/ <u>  </u> Probe <u>  </u> FID <u>  </u> CGI <u>  </u> RAD <u>  </u> Det Tube <u>  NIOSH 5503  </u> Other <u>  </u> Lumex	<u>  </u> PID w/ <u>  </u> Probe <u>  </u> FID <u>  </u> CGI <u>  </u> RAD <u>  </u> Det Tube <u>  </u> Other <u>  </u> Lumex



## Control Measures

Site Map with Work Zones: To be determined on-site.



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Exclusion Zone - the area where contamination is either known or expected to occur and the greatest potential for exposure exists. The outer boundary of the Exclusion Zone, called the Hotline, separates the area of contamination from the rest of the site.

Contamination Reduction Zone (CRZ) - the area in which decontamination procedures take place. The purpose of the CRZ is to reduce the possibility that the Support Zone will become contaminated or affected by the site hazards.

Support Zone - the uncontaminated area where workers are unlikely to be exposed to hazardous substances or dangerous conditions. The Support Zone is the appropriate location for the command post, medical station, equipment and supply center, field laboratory, and any other administrative or support functions that are necessary to keep site operations running efficiently.



**Communications:**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Buddy System  | <input type="checkbox"/> Radio (cell phone)                     |
| <input type="checkbox"/> Air Horn for Emergencies | <input checked="" type="checkbox"/> Hand Signals/Visual Contact |

**Personnel Decontamination Procedures:**

- ☐ None
- ☐ Wet Decontamination (procedures as follows)
- ☒ Dry Decontamination (procedures as follows)
- Don gloves
  - Hand wipe/brush of sediment
  - Place used PPE in poly trash bag for disposal
  - Remove gloves

**Equipment Decontamination Procedures:**

- ☐ None
- ☒ Wet Decontamination (procedures as follows)
- Alconox wash and tap water rinse to remove gross contamination
  - Di water rinse
  - Air dry
- ☐ Dry Decontamination (procedures as follows)

Adequacy of decontamination determined by: RST 2 On-Site Health and Safety Officer.

**Personal Protective Equipment**

TASK TO BE PERFORMED	ANTICIPATED LEVEL OF PROTECTION	TYPE OF CHEMICAL PROTECTIVE COVERALL	INNER GLOVE / OUTER GLOVE / BOOT COVER	APR CARTRIDGE TYPE or SCBA
Air, Chip, Wipe, material Sampling	Level D	None	Blue Nitrile/Green Nitrile/	None
Site Documentation	Level D	None	Blue Nitrile/Green Nitrile/	None



### Hazard Task Analysis

RISK LEVEL (High, Medium, Low)	HAZARD	RECOGNITION/ SYMPTOMS	MITIGATION	LEVEL OF PROTECTION
Medium	Slips, Trips, Falls and Uneven Walking Surfaces	Exterior walking surfaces clear of debris, fallen trees, overgrown vegetation and uneven surfaces that may increase the potential for an incident.	Maintain walking paths in cleared areas.	Level D
Medium	Chip particles and/or dust, eyes and breathing	Activities conducted using mallet and chisel	Proper PPE: goggles and mask.	Level D

#### Frequency and Types of Air Monitoring:

☐ Continuous
 ☒ Routine - As requested by OSC or deemed necessary
 ☐ Periodic -

DIRECT READING INSTRUMENTS	MultiRAE CGI / O <sub>2</sub> / H <sub>2</sub> S / CL <sub>2</sub> / CO / PID	Ludlum 19 Micro-R Meter / Ludlum Model 3 Survey Meter	MicroFID or TVA-1000	Drager Chemical Detector Tube	Particulate Monitors
EQUIPMENT ID NUMBER	TBD	N/A	N/A	N/A	N/A
CALIBRATION DATE		N/A		N/A	N/A
RST 2 PERSONNEL		N/A		N/A	N/A
ACTION LEVEL	≥ 10 - 20% LEL (Confined Space / non- Confined Space)  ≤ 19.5%, O <sub>2</sub> Deficient ≥ 23% O <sub>2</sub> - Enriched  H <sub>2</sub> S - PEL: 20 ppm IDLH: 100 ppm  Cl <sub>2</sub> - PEL: 1 ppm IDLH: 10 ppm	<3X Background Exercise Caution;  ≥ 1 mR/HR - Exit Area, Establish Perimeter, Contact RST 2 HSO	Unknowns:  1 - 5 Units - "Level C"  5-500 Units- "Level B"	PEL / TLV / IDLH: Compare with Drager Tube	TBD



### Emergency Telephone Numbers

Emergency Contact	Location / Address	Telephone Number	Notified
Hospital	<b><u>Mountainside Hospital</u></b> 1 Bay Avenue Montclair, NJ 07042	(973) 429-6000	N
Ambulance	911		N
Police	230 Fairfield Road Fairfield, NJ 07004	(973) 227-1400	N
Fire Department	230 Fairfield Road Fairfield, NJ 07004	(973) 227-1400	N

Chemical Trauma Capability? ☒ Yes ☐ No

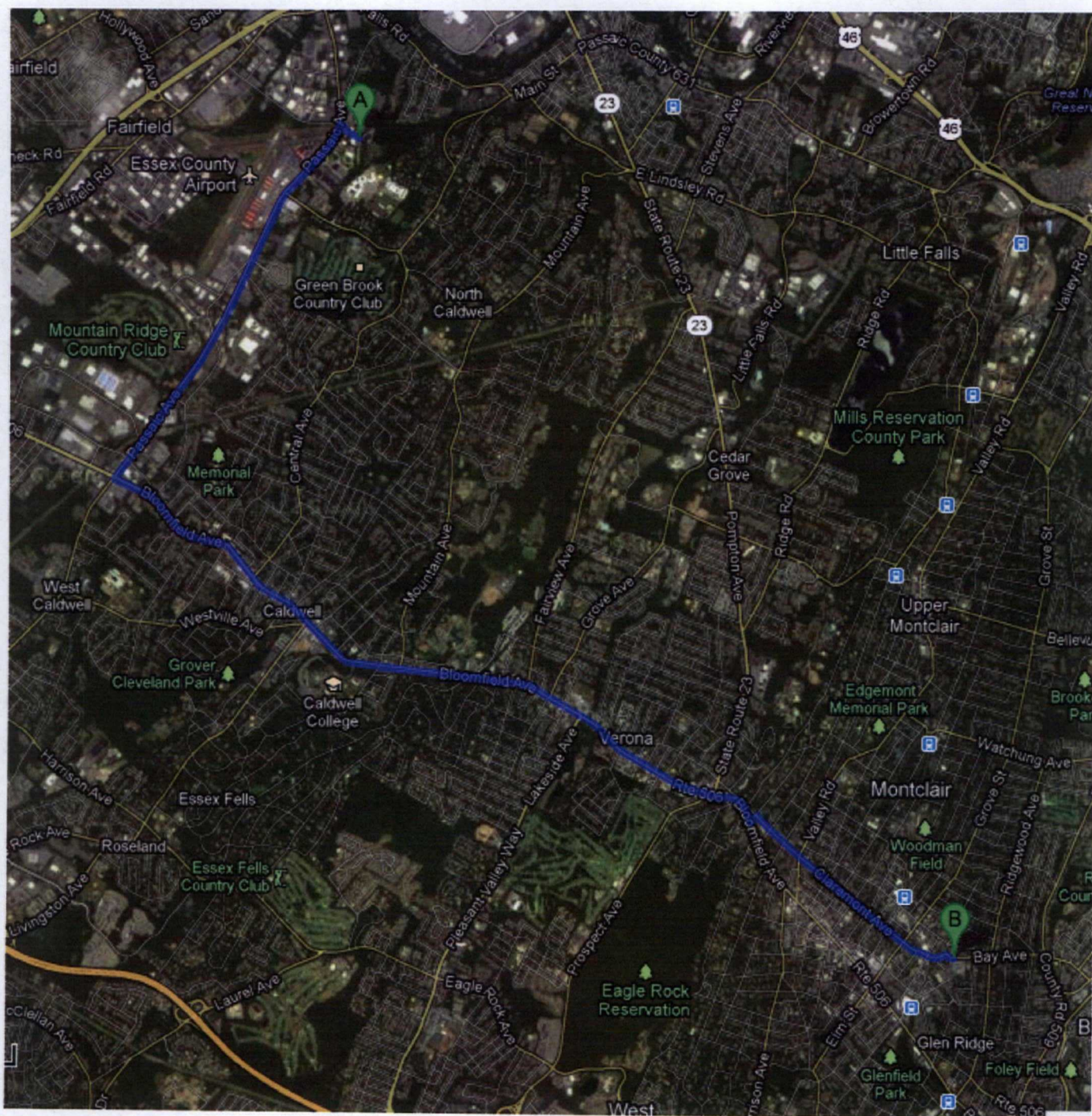
If no, closest backup: \_\_\_\_\_ Phone:

Directions to Hospital (Attach Color Map Following This Page):

1. Head **northwest** on **Sherwood Ln** toward **Passaic Ave**
2. Turn left onto **Passaic Ave**
3. Turn left onto **Bloomfield Ave/Rte 506**
4. Turn left onto **Prospect Ave**
5. Take the 1st right onto **Claremont Ave**
6. Continue onto **Bay Ave**

Destination will be on the left





\*\*This map is subject to Google's Terms of Service, and Google is the owner of rights therein.

Route verified by: \_\_\_\_\_ Date: \_\_/\_\_/\_\_



### Additional Emergency Telephone Contacts

<b>WESTON Medical Emergency Service</b> Dr. Peter Greaney, Medical Director WorkCare 300 South Harbor Blvd, Suite 600 Anaheim, California 92805	800-455-6155 Regular Business Hours (9AM to 7:30PM) Dial 0 or Ext. 175 for Michelle Bui to request the on-call clinician. 800-455-6155 After Hours (Weekdays 7:31PM to 8:59AM, Weekends, Holidays) Dial 3 to reach the after-hours answering service. Request that the service connect you with the on-call clinician or the on-call clinician will return your call within 30 minutes.
Chemtrec	800-424-9300
ATSDR	404-639-0615
ATF (explosives information)	800-424-9555
National Response Center	800-424-8802
National Poison Control Center	800-764-7661
Chemtel	800-255-3924
DOT	800-424-8802
CDC	800-232-0124

### Pre-Response Approval

HASP prepared by: Lionel Montanez

Date: 10/11/2012

Pre-Response/Entry Approval by: Timothy Benton

Date: 10/11/2012

Tasks Conducted	Level of Protection/Specific PPE Used
Air, Chip, Wipe, material Sampling	Level D
Site Documentation	Level D



## Hazardous Waste Site and Environmental Sampling Activities

Off Site: ☐ Yes ☒ No

On Site: ☒ Yes ☐ No

Describe types off samples and methods used to obtain samples:

RST 2 is tasked with the collection of 7 air samples (one sample per room in building), up to 70 chip samples (floors and walls), up to 130 wipe samples (fans, walls, floors and trusses), up to 30 material samples (wood, cardboard, forklifts, tires, shoes, vehicle floor mats, etc) and up to 10 MicroVac samples. Wipe samples collected from the bottom of employees shoes and car mats are to determine if any migration of any contaminants is taking place. All sample locations to be determined by the EPA On-Scene Coordinator (OSC). Chip and wipe samples will be submitted to a Contract Laboratory Program (CLP) laboratory (KAP Technologies Inc) for target compound list (TCL) polychlorinated biphenyl (PCB) analysis. In addition, one rinsate blank per day will be collected from non-dedicated sampling equipment which will also be submitted for TCL PCB analysis. Material, MicroVac and air samples will be submitted to a private lab (ALS Environmental) for TCL PCB analysis.

The following sampling design is based on information currently available and may be modified on site based on other acquired information:

Wipe, chip and material sampling activities will be conducted in accordance with guidelines outlined in EPA/ERT Soil Sampling SOP #2011. Wipe, chip and material samples will be collected at up to 230 locations throughout the Site. Wipe samples will be collected using gauze saturated with hexane on designated areas. The samples will be place in glass amber unpreserved VOA vials. Chip samples will be obtained using a chisel and hammer then collected and homogenized in a stainless steel bowl or pie pans. The homogenized samples will be placed in glass sample jars. Air samples will be collected using SKC pumps and cartridge. A manlift will be utilized to collect samples required at elevation.

All stainless-steel equipment involved in field-sampling activities will be decontaminated in accordance to EPA/ERT SOP #2006 prior to and subsequent to sampling. Decontamination of sampling equipment will be conducted as follows:

1. Alconox detergent and potable water scrub.
2. Potable water rinse.
3. Deionized water rinse.
4. Air dry (sufficient time will be allowed for the equipment to completely dry).
5. Deionized water rinse and air dry.

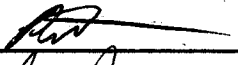
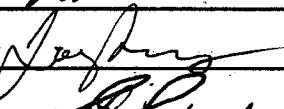
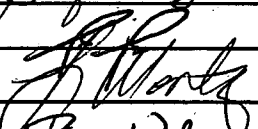
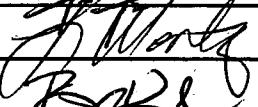
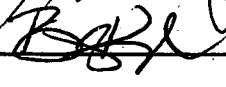
Was laboratory notified of potential hazard level of samples?

☒ Yes ☐ No

Disclaimer: This Health and Safety Plan (HASP) was prepared for work to be conducted under RST 2 Contract EP-W-06-072. Use of this HASP by WESTON and its subcontractors is intended to fulfill the OSHA requirements found in 29 CFR 1910.120. Items not specifically covered in this HASP are included by reference to 29 CFR 1910 and 1926.



The signatures below indicate that the individuals have read and understood this Health and Safety Plan.

PRINTED NAME	SIGNATURE	AFFILIATION	DATE
PETER LUCHINSKI		WESTON	10/10/12
Joseph Boudens		Weston	10/15/12
Scott Snyder		"	"
LIONEL MONTANE		WESTON	10/15/12
Brittney Kelly		Weston	10/15/12

**Post-Response Approval**

Final Submission of HASP by:		Date:
Post Response Approval by:		Date:
RST 2 HSO Review by:		Date:



**ATTACHMENT A:**  
**NIOSH POCKET GUIDES**





Centers for Disease Control and Prevention  
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## Search the Pocket Guide

Enter search terms separated by spaces.

Chlorodiphenyl (54% chlorine)						
Synonyms & Trade Names Aroclor® 1254, PCB, Polychlorinated biphenyl						
CAS No. 11097-69-1		RTECS No. <u>TQ1360000</u> ( <u>/niosh-rtecs/TQ14Co8o.html</u> )		DOT ID & Guide 2315 171 ( <u>http://wwwapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/guidepage.aspx?guide=171</u> ) ☞ ( <u>http://www.cdc.gov/Other/disclaimer.html</u> )		
Formula $C_6H_3Cl_2C_6H_2Cl_3$ (approx)		Conversion		IDLH Ca [5 mg/m³] See: <u>IDLH INDEX</u> ( <u>/idlh/intridl4.html</u> )		
Exposure Limits NIOSH REL *: Ca TWA 0.001 mg/m³ <u>See Appendix A</u> ( <u>nengapdxa.html</u> ) [*Note: The REL also applies to other PCBs.] OSHA PEL : TWA 0.5 mg/m³ [skin]				Measurement Methods <b>NIOSH 5503</b> ☞ ( <u>/niosh/docs/2003-154/pdfs/5503.pdf</u> ); <b>OSHA PV2088</b> ( <u>http://www.osha.gov/dts/sltc/methods/partial/t-pv2088-01-8812-ch/t-pv2088-01-8812-ch.html</u> ) ☞ ( <u>http://www.cdc.gov/Other/disclaimer.html</u> ) See: <u>NMAM</u> ( <u>/niosh/docs/2003-154/</u> ) or <u>OSHA Methods</u> ( <u>http://www.osha.gov/dts/sltc/methods/index.html</u> ) ☞ ( <u>http://www.cdc.gov/Other/disclaimer.html</u> )		
Physical Description Colorless to pale-yellow, viscous liquid or solid (below 50°F) with a mild, hydrocarbon odor.						
MW: 326 (approx)	BP: 689-734°F	FRZ: 50°F	Sol: Insoluble	VP: 0.00006 mmHg	IP: ?	
Sp.Gr(77°F): 1.38	FLP: NA	UEL: NA	LEL: NA			
Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs, polychlorinated dibenzofurans, and chlorinated dibenzo-p-dioxins.						
Incompatibilities & Reactivities Strong oxidizers						
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact						
Symptoms irritation eyes, chloracne; liver damage; reproductive effects; [potential occupational carcinogen]						
Target Organs Skin, eyes, liver, reproductive system						

<b>Cancer Site</b> [in animals: tumors of the pituitary gland & liver, leukemia]	
<b>Personal Protection/Sanitation</b> ( <a href="#">See protection codes (protect.html)</a> ) <b>Skin:</b> Prevent skin contact <b>Eyes:</b> Prevent eye contact <b>Wash skin:</b> When contaminated <b>Remove:</b> When wet or contaminated <b>Change:</b> Daily <b>Provide:</b> Eyewash, Quick drench	<b>First Aid</b> ( <a href="#">See procedures (firstaid.html)</a> ) <b>Eye:</b> Irrigate immediately <b>Skin:</b> Soap wash immediately <b>Breathing:</b> Respiratory support <b>Swallow:</b> Medical attention immediately
<b>Respirator Recommendations</b> <b>NIOSH</b> <b>At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:</b> (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus <b>Escape:</b> (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having an N100, R100, or P100 filter. <a href="#">Click here (pgintrod.html#npr)</a> for information on selection of N, R, or P filters. Any appropriate escape-type, self-contained breathing apparatus <b>Important additional information about respirator selection</b> ( <a href="#">pgintrod.html#mustread</a> )	
See also: <a href="#">INTRODUCTION (/niosh/npg/pgintrod.html)</a> See ICSC CARD: <a href="#">0939 (/niosh/ipcsneng/nengo939.html)</a> See MEDICAL TESTS: <a href="#">0176 (/niosh/docs/2005-110/nmedo176.html)</a>	

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Content source: [National Institute for Occupational Safety and Health \(NIOSH\)](#) Education and Information Division

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## Search the Pocket Guide

Enter search terms separated by spaces.

n-Hexane					
Synonyms & Trade Names Hexane, Hexyl hydride, normal-Hexane					
CAS No. 110-54-3		RTECS No. <u>MN9275000</u> ( <a href="http://niosh-rtecs/MN8D8678.html">/niosh-rtecs/MN8D8678.html</a> )		DOT ID & Guide 1208 128 ( <a href="http://wwwapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/guidepage.aspx?guide=128">http://wwwapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/guidepage.aspx?guide=128</a> ) & ( <a href="http://www.cdc.gov/Other/disclaimer.html">http://www.cdc.gov/Other/disclaimer.html</a> )	
Formula CH <sub>3</sub> [CH <sub>2</sub> ] <sub>4</sub> CH <sub>3</sub>		Conversion 1 ppm = 3.53 mg/m <sup>3</sup>		IDLH 1100 ppm [10%LEL] See: <a href="http://niosh/idlh/110543.html">110543 (/niosh/idlh/110543.html)</a>	
Exposure Limits NIOSH REL : TWA 50 ppm (180 mg/m <sup>3</sup> ) OSHA PEL † ( <a href="http://nengapdxg.html">nengapdxg.html</a> ): TWA 500 ppm (1800 mg/m <sup>3</sup> )				Measurement Methods NIOSH 1500 & ( <a href="http://niosh/docs/2003-154/pdfs/1500.pdf">/niosh/docs/2003-154/pdfs/1500.pdf</a> ), 3800 & ( <a href="http://niosh/docs/2003-154/pdfs/3800.pdf">/niosh/docs/2003-154/pdfs/3800.pdf</a> ); OSHA 7 ( <a href="http://www.osha.gov/dts/sltc/methods/organic/org001/org001.html">http://www.osha.gov/dts/sltc/methods/organic/org001/org001.html</a> ) & ( <a href="http://www.cdc.gov/Other/disclaimer.html">http://www.cdc.gov/Other/disclaimer.html</a> ) See: NMAM ( <a href="http://niosh/docs/2003-154/">/niosh/docs/2003-154/</a> ) or OSHA Methods ( <a href="http://www.osha.gov/dts/sltc/methods/index.html">http://www.osha.gov/dts/sltc/methods/index.html</a> ) & ( <a href="http://www.cdc.gov/Other/disclaimer.html">http://www.cdc.gov/Other/disclaimer.html</a> )	
Physical Description Colorless liquid with a gasoline-like odor.					
MW: 86.2	BP: 156° F	FRZ: -219°F	Sol: 0.002%	VP: 124 mmHg	IP: 10.18 eV
Sp.Gr: 0.66	FLP: -7° F	UEL: 7.5%	LEL: 1.1%		
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.					
Incompatibilities & Reactivities Strong oxidizers					
Exposure Routes inhalation, ingestion, skin and/or eye contact					
Symptoms irritation eyes, nose; nausea, headache; peripheral neuropathy: numb extremities, muscle weak; dermatitis; dizziness; chemical pneumonitis (aspiration liquid)					
Target Organs Eyes, skin, respiratory system, central nervous system, peripheral nervous system					
Personal Protection/Sanitation (See protection codes ( <a href="http://protect.html">protect.html</a> )) Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation				First Aid (See procedures ( <a href="http://firstaid.html">firstaid.html</a> )) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations					
NIOSH					

**Up to 500 ppm:**

(APF = 10) Any supplied-air respirator\*

**Up to 1100 ppm:**

(APF = 25) Any supplied-air respirator operated in a continuous-flow mode\*

(APF = 50) Any self-contained breathing apparatus with a full facepiece

(APF = 50) Any supplied-air respirator with a full facepiece

**Emergency or planned entry into unknown concentrations or IDLH conditions:**

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

**Escape:**

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister

Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection ([pgintrod.html#mustread](#))

See also: INTRODUCTION ([/niosh/npg/pgintrod.html](#)) See ICSC CARD: [0279 \(/niosh/ipcsneng/nengo279.html\)](#)

See MEDICAL TESTS: [0114 \(/niosh/docs/2005-110/nmedo114.html\)](#)

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**ATTACHMENT B:**

**WESTON FLDS**

## **FLD 02 INCLEMENT WEATHER**

Hot weather (ambient temperatures over 70°F), cold weather (ambient temperatures below 40°F), rain, snow, ice, and lightning are examples of inclement weather that may be hazardous or add risk to work activities. Extremes of heat, cold, and humidity, as well as rain, snow, and ice, can adversely affect monitoring instrument response and reliability, respiratory protection performance, and chemical protective clothing materials.

### **RELATED FLDs AND OP**

*FLD 05 – Heat Stress Prevention and Monitoring*

*FLD 06 – Cold Stress*

*OP 05-03-008 – Inclement Weather & Business Disruption Policy*

### **PROCEDURE**

The potential for exacerbating the impact of physical hazards must be considered for tasks that expose personnel to inclement weather. Risk assessment and hazards analysis should be accomplished during the planning stages of a project for the most likely inclement weather conditions that may be encountered, i.e., rain and lightning in late spring, summer, and early fall, or lightning prone areas; cold, snow, and ice in winter. The Field Safety Officer (FSO) must determine the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his/her work and be actively alert to these hazards. Managers and workers must be familiar with the requirements of FLD 05 and FLD 06.

A pre-site activity risk assessment must be completed when inclement weather occurs. Weather conditions that affect instruments and personal protective equipment (PPE) function must be conveyed to site workers who should monitor function and integrity of PPE and be alert to changing weather conditions. A decision must be made on the proper safety procedures to use if work must continue, or to stop work if the risk is too great. The appropriate Safety Professional must be notified of all instances of the need to stop work for safety reasons, including inclement weather.

#### **Heat**

Hot, dry weather increases risk of soil drying, erosion, and dust dispersion, which may present or increase risk of exposure and environmental impact from toxic hazards. Hot weather will increase pressure on closed containers and the rate of volatilization, thereby potentially increasing the risk of exposure to toxic, flammable, or explosive atmospheres.

#### **Prevention and Protective Measures**

Employees must be protected from airborne contaminants using engineering controls such as wetting dry soil to prevent particle dispersion, and providing local ventilation to reduce volatile air contaminants to safe levels, or if engineering controls are infeasible, using prescribed PPE. Wind shifts and velocity should be measured where change may result in dispersion of airborne contaminants into the work area.

#### **Rain, Wet Weather, and High Humidity**

Wet conditions resulting from rain and wet weather increase slipping and tripping hazards, braking distances of vehicles, the potential for vehicle skidding, or difficulties in handling powered devices such as augers and drills. Rain fills holes, obscures trip and fall hazards, and increases risk of electrical shock



when working with electrical equipment. Changes in soil conditions caused by rain can impact trenching and excavating activities, creating the potential for quicksand formation, wall collapse, and cave-in. Vehicles become stuck in mud, and tools and personnel can slip on wet surfaces. Rain and wet conditions may decrease visibility (especially for personnel wearing respiratory protection) and limit the effectiveness of certain direct-reading instruments (e.g., photoionization detectors [PIDs]).

Feet that become wet and are allowed to remain wet can lead to serious problems under both heat and cold conditions. Activities that may result in wet feet include extended work in chemical protective clothing and wading in water/liquid during biological assessments. Trench foot, paddy foot, and immersion foot are terms associated with foot ailments resulting from feet being wet for long periods of time. All have similar symptoms and effects. Initial symptoms include edema (swelling), tingling, itching, and severe pain. These may be followed by more severe symptoms including blistering, death of skin tissue, and ulceration. (NOTE: The following Preventive and Protective Measures also apply to Cold, Snow, and Ice.)

#### Preventive and Protective Measures

Walkways, stairs, ladders, elevated workplaces, and scaffold platforms must be kept free of mud, ice, and snow. Employees shall be prohibited from working on scaffolds covered with snow, ice, or other slippery material except as necessary for removal of such materials.

Vehicles used in rain or cold weather must have working windshield wipers and defrosters, and windows must be kept clear of obstruction.

Drivers must observe traffic laws, including maintaining speed within limits safe for weather conditions, and wearing seat belts at all times. Note that this may mean operating below the posted speed limit.

When walking, workers should use a walking stick or probe to test footing ahead where there is standing water, snow, or ice to protect the walker against stepping into potholes or onto puncture hazards, buried containers, or other potential structurally unsound surfaces.

Prior to using vehicles or equipment in off-road work, workers should walk the work area or intended travelway when puddles or snow may obscure potholes, puncture hazards, or buried containers, or other potential structurally unsound surfaces.

Project managers should arrange to have winches, come-alongs, or other mechanical assistance available when vehicles are used in areas where there is increased risk of getting stuck. Cable or rope and mechanical equipment used for pulling stuck vehicles must be designed for the purpose, of sufficient capacity for the load, and be inspected regularly and before use to ensure safety. **Manually pushing stuck vehicles is to be avoided.**

Prevention methods are required when work is performed in wet conditions or when conditions result in sweating, causing the feet to become and remain wet. Proper hygiene is critical. Workers must dry their feet and change socks regularly to avoid conditions associated with wet feet. Use of foot talc or powder can additionally assist in prevention of this type of condition.

#### **Cold, Snow, and Ice**

Cold weather affects vehicle operation by increasing difficulty in starting and braking. Ice, frost, and snow can accumulate on windows and reduce vision. Cold, wet weather can cause icing of roadways,

driveways, parking areas, general work places, ladders, stairs, and platforms. Ice is not always as obvious to see as snow or rain, and requires special attention, especially when driving or walking.

Snow and ice increase the risk of accidents such as slipping when walking, climbing steps and ladders, or working at elevation, and the risk of accidents when driving vehicles or operating heavy equipment. Heavy snow and ice storms may cause electric lines to sag or break, and the use of electrical equipment in snow increases the risk of electric shock. Snow can hide potholes and mud, which can result in vehicles getting stuck or persons falling when stepping into hidden holes. Snow also may cover water, drums or other containers, sharp metal objects, debris, or other objects that can cause falls or punctures.

#### Preventive and Protective Measures

WESTON personnel are cautioned against operating motor vehicles such as cars or trucks on ice under any circumstances. If traveling in icy conditions, WESTON personnel should follow all public service advisories that curtail driving activities.

Personnel performing activities that require working over ice should be aware of minimal ice thickness safety guidelines as follows:

- 4-inch minimum: activities such as walking or skating.
- 6-inch minimum: activities such as snowmobiling or the use of equipment with the same weight and cross-sectional area as a snowmobile.

Personnel should always be aware that these measurement guidelines are under ideal conditions and that snow cover, conditions on rivers, ponds, or lakes with active currents, and other environmental factors impact the safety of working on ice. Clear ice typically is the strongest, while ice that appears cloudy or honeycombed (contains entrained air) is not as structurally strong. Measurements made by drilling or cutting through the ice should be made every few feet to verify safe conditions. Provisions for rescue (e.g., ladders or long poles and effective communications) must be available at the work site.

#### **Lightning**

Lightning represents a hazard of electrical shock that is increased when working in flat open spaces, elevated work places, or near tall structures or equipment such as stacks, radio towers, and drill rigs. Lightning has caused chemical storage tank fires and grass or forest fires. Static charges associated with nearby electrical storms can increase risk of fire or explosion when working around flammable materials, and can adversely affect monitoring instruments.

Lightning is the most dangerous and frequently encountered weather hazard people experience each year. Lightning affects all regions. **Florida, Michigan, Pennsylvania, North Carolina, New York, Ohio, Texas, Tennessee, Georgia, and Colorado** have the most lightning deaths and injuries.

#### Preventive and Protective Measures

Prior to working in areas or beginning projects when or where there is an increased potential for lightning striking personnel, steps must be taken to predict the occurrence of lightning strikes. Recommendations include:

- Check with client management to determine if there are any patterns or noted conditions that can help predict lightning or if there are structures that are prone to lightning strikes. Arrange for



client notification when there is increased potential for lightning activities. Ensure that clients include WESTON workers in lightning contingency plans.

- Monitor weather reports.
- Note weather changes and conditions that produce lightning.
- Stop work in open areas, around drill rigs or other structures that may attract lightning, on or in water and in elevated work places when lightning strikes are sighted or thunder is heard near a work site.
- Ensure all personnel are provided with safe areas of refuge. Prevent personnel from standing in open areas, under lone trees, or under drill rigs.
- Observe the "30-30" Rule. If you see lightning and thunder is heard within 30 seconds (approximately 6 miles), seek shelter. If you hear thunder, but did not see the lightning, you can assume that lightning is within 6 miles and you should seek shelter. Remain in the sheltered location for 30 minutes following the last lightning strike.
- Use a hand held static potential meter (lightning detection device) to monitor the potential difference between a cloud and the ground. When the measured potential is greater than 2 kV/m, there is a potential for a lightning strike – seek shelter.

## **High Wind and Tornado Safety**

### **High Winds**

Many construction workers have died due to wind-related accidents and injuries. A ladder that seems secure under normal circumstances can become unstable during windy conditions and cause you to fall. Scaffolding that is improperly secured can rip free during strong winds and kill bystanders. The risk of injury for construction workers increases during strong winds. Keep in mind that changing weather conditions can affect your daily work tasks, and make sure you have a game plan to prevent proper damage and personal injury.

**Stay Informed:** With today's modern technology available at the touch of a button, you should keep up to date with the latest local weather reports. Visit [weatherbug.com](http://weatherbug.com) or [weather.gov](http://weather.gov) to stay informed in case of wind warnings, watches, and advisories. Larger projects may have their own weather station on site to provide instant weather data. Use daily hazard assessments to determine if working conditions have changed or will change throughout the day.

**Be Prepared:** When you know the weather will be windy, secure loose building materials, scaffolding and fencing that could be picked up or torn loose by strong winds and thrown onto surrounding streets, structures, vehicles, or bystanders.

**Know the Limits of Your Equipment:** When operating any equipment, take time to read the operator's manual and become familiar with the wind specifications. Many crane manufacturers have high-wind guidelines to prevent you from operating a crane in unsafe weather. You should also check safety equipment such as fall protection to determine if it is adequate for windy conditions.

## Know the Terminology

### Severe Thunderstorm Watch

A Severe Thunderstorm Watch means that strong thunderstorms capable of producing winds of 58 mph or higher and/or hail 3/4 inches in diameter or larger are possible. If you are in the area of a Severe Thunderstorm Watch, you should be prepared to take shelter from thunderstorms. Severe Thunderstorm Watches are generally issued for 6-hour periods.

### Severe Thunderstorm Warning

A Severe Thunderstorm Warning means that thunderstorms capable of strong winds and/or large hail are occurring or could form at any time. If you are in the area of a severe thunderstorm, you should take shelter indoors immediately, avoid windows, and be prepared for high winds and hail. Severe Thunderstorm Warnings are generally in effect for an hour or less.

### High Wind Watch

A High Wind Watch is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are likely to develop in the next 24 to 48 hours. For summit areas, high wind watches are issued when sustained winds are expected to exceed 45 mph and/or frequently gust over 60 mph. If you are in an area for which a High Wind Watch has been issued you should secure loose objects outdoors that may blow about and avoid outdoor activity that exposes you to high winds.

### High Wind Warning

A High Wind Warning is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are occurring or imminent. For summit areas, warnings are issued for winds exceeding 45 mph and/or frequently gusting over 60 mph. Wind warnings may issued up to 24 hours ahead of the onset of high winds and remain in effect for 6 to 12 hours. If you are in an area where a high wind warning is in effect you should avoid activities that expose you to high winds. Loose objects may be blown around. Tree limbs may break and fall. Power lines may be blown down.

### Wind Advisory

A Wind Advisory is issued when sustained winds of 30 to 39 mph and/or frequent gusts to 50 mph or greater are occurring or imminent. Wind advisories may be in effect for 6 to 12 hours. If you are in an area where a wind advisory is in effect you should secure loose objects that may be blown about outdoors and limit activity that may expose you to high winds.

Work Safely: If you will be working on a windy day, you should be alert and protected. Wear eye protection to prevent dust and other particles from entering or striking your eyes. Keep your hard hat on at all times to prevent injuries from falling or flying objects. The likelihood of falls from heights is greatly increased by strong winds. Wear the necessary PPE to ensure your safety.

### To avoid flying debris and to minimize damage during high winds:

- Shut down outdoor activities involving work at elevation on ladders, scaffolding, aerial lifts, etc.; handling large tarps and plastic sheeting when wind speeds exceed 25 mph; including work with radioactive materials and highly toxic materials that could be dispersed by the winds.
- At 13 - 18 mph wind will raise dust. Follow the dust action level.



- Move mobile items stored outside to indoor storage.
- Secure any items that cannot be moved inside.
- Be careful opening exterior doors.
- Be cautious about downed power lines, tree limbs, and debris on roads.
- Be alert for animals who have escaped from farms and zoos.

Stay Away from Power Lines: High winds can cause tree limbs to fall on power lines resulting in electrocution hazards or loss of power. Your best bet is to keep your distance.

## Tornados

### What is a TORNADO?

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm or as a result of severe weather associated with hurricanes. A funnel cloud is formed as cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado results from high wind velocity and wind blown debris.

### Tornado Safety

When a tornado approaches, you have only a brief amount of time to make life-or-death decisions. Advance planning and quick response are the keys to surviving a tornado.

Purchase a NOAA Weather Alert radio with an alert feature. When tuned to the proper frequency, these weather radios remain silent until a weather emergency occurs. Once they pick up the alarm tone, they will begin broadcasting emergency weather information so that citizens can protect themselves and their property. Some models of the NOAA weather radio incorporate the Specific Area Message Encoder technology, allowing users to target only those warnings that affect their immediate geographic area.

Conduct tornado drills. Designate an area to serve as your safe area, and practice having team members assemble there in response to a mock tornado warning.

Emergency Communications Plan. Develop an emergency communications plan in case team members are separated from one another when a tornado warning goes into effect. Designate an emergency coordinator. Instruct everyone to contact this coordinator in a weather emergency for instructions on what to do during the storm and where to reassemble after the emergency has passed. Design contingency plans to be consistent with client contingency plans. When possible use client warning and alerting systems and confirm that team members have access to shelters and know how to get to them.

### Know the Difference between a Tornado Watch and a Tornado Warning

Tornado Watch: Issued by the National Weather Service when tornadoes are possible in your area. You should remain alert for approaching storms. Remind family members of where the safe areas are within your home, and carefully monitor radio or television reports for further developments.

Tornado Warning: Indicates that a tornado has been sighted in your area, or is indicated on weather radar. You should proceed to safe shelter immediately.

*When A Tornado Warning Goes In Effect, Put Your Safety Plans In Action.*

**In Your Automobile:** Motor vehicles are easily overturned by tornado winds. Leave your vehicle and seek shelter in a sturdy building. As a last resort, seek shelter in a ditch or culvert. Do not try to outrun or outmaneuver a tornado! Use the time to seek appropriate shelter outside your vehicle.

**Office Buildings, Hotels, and Shopping Centers:** Take shelter in an interior hallway on a lower floor. A closet, bathroom or other small room with short, stout walls will give some protection from collapse and flying debris. Otherwise, get under heavy furniture and stay away from windows. Many tornado deaths have occurred in large buildings due to the collapse of a roof or wide span wall. A corner area, away from a window, is safer than the middle of a wide span wall.

**Out In Open Country:** When severe weather approaches, seek inside shelter immediately. The chances of encountering falling trees, downed power lines and lightning are far greater than encountering a tornado itself. If a tornado approaches, lie flat in the nearest depression, such as a culvert or ditch, and cover your head with your arms.

**BE ALERT TO CHANGING WEATHER CONDITIONS**  
**HAVE AN EMERGENCY WEATHER PLAN IN PLACE**  
**REHEARSE YOUR CONTINGENCY PLANS PERIODICALLY**  
**KNOW WHERE TO GO WHEN A TORNADO THREATENS.**



## FLD 06 COLD STRESS

Three major factors that contribute to cold stress are cold temperatures, dampness, and wind velocity. Persons working outdoors in low temperatures, especially in wet or windy conditions, are subject to cold stress. Exposure to extreme cold for even a short time can cause severe injury to the surface of the body, or result in cooling of the body core temperature which, if unchecked, can be fatal. Site workers must learn to recognize and treat the various forms of cold stress.

### RELATED FLDs

*FLD 02 – Inclement Weather*

*FLD 17 – Diving*

*FLD 19 – Working Over or Near Water*

*FLD 25 – Working at Elevation/Fall Protection*

### GENERAL INFORMATION

Body heat is conserved through the constriction of surface blood vessels. This constriction reduces circulation at the skin layers and keeps blood nearer the body core. Loss of body heat can occur through:

1. Respiration – The process of breathing; inhaling and exhaling air. Heat is lost when breathing cold air into the lungs.
2. Evaporation – Heat loss from the body by vaporization of water from the skin surface.
3. Conduction – Direct transfer of body heat by contact with a cooler object. Conduction may occur when sitting on snow, touching cold equipment, and working in the rain. Body heat is lost rapidly when a person becomes wet. Most clothing loses approximately 90 percent of its insulating properties when wet. Additionally, water conducts heat 240 times faster than air; thus, the body cools suddenly when the layer of clothing that contacts the skin becomes wet.
4. Radiation – Heat radiated outward from the body to a cooler environment. The greatest amount of body heat is lost from uncovered surfaces of the body, especially the head, neck, and hands.
5. Convection – Heat transferred to cool air moving across the surface of the body. The body continually heats a thin layer of air next to the skin. Clothing retains this warm surface layer of air. If this warm air is removed by air currents (wind), the body will be cooled while attempting to rewarm the surface air. Wind chill is the chilling effect of moving air in combination with low temperature.

Other factors may contribute to cold stress, such as:

1. Medications, including antidepressants, sedatives, tranquilizers and some heart medications may affect the body's ability to thermo-regulate.
2. Dehydration, or the loss of body fluids, occurs in a cold environment and may increase the susceptibility of workers to cold injury due to a significant change in blood flow to the extremities.
3. Heavy work typically causes sweating that will result in wet clothing.

4. A worker's predisposing health condition such as cardiovascular disease, diabetes, and hypertension.
5. Older people are not able to generate heat as quickly, thus may be at more risk than younger adults.

When the body is unable to warm itself, serious cold-related illness and injuries may occur, including permanent tissue damage and possible death.

## **RECOGNITION AND RISK ASSESSMENT**

In the planning stages of a project, the potential for cold-related hazards must be considered in the site-specific Health and Safety Plan (HASP) and during risk assessment. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

### **Low Temperature + Wind Speed + Wetness = Injuries and Illness**

The Cold Stress Equation (OSHA Card-3156) is a quick-reference tool provided on the Weston Portal.

#### **Frostbite**

Frostbite is the freezing of tissue and most commonly affects the toes, ears, fingers, and face. Frostbite occurs when an extremity loses heat faster than it can be replaced by the circulating blood. Frostbite may result from direct exposure to extreme cold or cool, high wind. Damp socks and shoes may contribute to frostbite of the toes.

Signs and symptoms of frostbite include:

- Cold, tingling, aching, or stinging feeling followed by numbness
- Skin color is red, purple, white, or very pale and is cold to the touch
- Blisters may be present (in severe cases)

Treatment for frostbite:

- Call for emergency medical assistance.
- Move the victim indoors and/or away from additional exposure to cold, wet, and wind.
- Wrap the affected area in a soft, clean cloth (sterile, if available).
- Give a warm drink (water or juices, not coffee, tea or alcohol). Do not allow the victim to smoke.
- Do not rub the frostbitten part (this may cause gangrene).
- Do not use ice, snow, gasoline or anything cold on the frostbitten area.
- Do not use heat lamps or hot water bottles to rewarm the frostbitten area.
- Do not place the frostbitten area near a hot stove.
- Do not break blisters.
- After rewarming, elevate the area and protect it from further injury.

#### **Hypothermia**

Hypothermia means "low heat" and is a potentially serious condition. Systemic hypothermia occurs when body heat loss exceeds body heat gain and the body core temperature falls below the normal 98.6°F. While some hypothermia cases are caused by extremely cold temperatures, most cases develop in air



temperatures between 30° and 50°F, especially when compounded with water immersion and/or windy conditions.

The victim of hypothermia may not know, or refuse to admit, that he or she is experiencing hypothermia. All personnel must be observant for these signs for themselves and for other team members. Hypothermia can include one or more of the following symptoms.

- Cool bluish skin
- Uncontrollable shivering
- Vague, slow, slurred speech
- Irritable, irrational, or confused behavior
- Memory lapses
- Clumsy movements, fumbling hands
- Fatigue or drowsiness

Below the critical body core temperature of 95°F, the body cannot produce enough heat by itself to recover. At this point, emergency measures must be taken to reverse the drop in core temperature. The victim may slip into unconsciousness and can die in less than 2 hours after the first signs of hypothermia are detected. Treatment and medical assistance are critical.

Treatment for hypothermia:

- Call for emergency medical assistance.
- Do not leave the victim alone.
- Prevent further heat loss by moving the person to a warmer location out of the wind, wet, and cold.
- Remove cold, wet clothing and replace with warm dry clothing or wrap the victim in blankets.
- If the victim is conscious, provide warm liquids, candy, or sweetened foods. Carbohydrates are the food most quickly transformed into heat and energy. Do not give the victim alcohol or caffeine.
- Have the person move their arms and legs to create muscle heat. If they are unable to move, place warm bottles or hot packs in the arm pits, groin, neck, and head. Do not rub the arms and legs or place the person in warm water.

### **Prevention and Protection**

The following general guidelines are recommended for preventing or minimizing cold stress:

- Wear loose, layered clothing, masks, woolen scarves, and hats. Wear liners under hard hats
- Protect hands with gloves or mittens.
- Never touch cold metal with bare hands.
- Wear waterproof, slip-resistant, insulated boots
- Use chemical foot and hand warmers (commercially available) inside boots and gloves.
- In extreme cold, cover the mouth and nose with wool or fur to “pre-warm” the air you breathe.
- If wearing a face protector, remove it periodically to check for frostbite.

- Ensure that clothing remains secure around the body, especially at the neck and waist.
- If required to wear chemical protective clothing, remember that it generally does not afford protection against cold stress. In many instances, chemical protective clothing increases susceptibility. Dress carefully if both chemical protection and thermal insulation are required.
- Remove outer layers to avoid overheating and soaking clothing with perspiration; replace layers to avoid becoming chilled.
- Keep clothes dry by wearing water-resistant and wind-resistant clothing and outerwear.
- Wear clothing that will "breathe" or allow water vapor to escape.
- Eat well-balanced meals, ensure adequate intake of liquids and avoid alcoholic beverages. Drink warm sweet beverages and soups. Limit the intake of caffeinated drinks due to the diuretic and circulatory effects.
- Utilize available warm shelters and implement work-rest schedules.
- If warm shelters are not available, use cars/vehicles as shelter from the cold. (Ensure that tailpipes are not covered by heavy snowfall).
- Use radiant heaters to provide warmth (if using propane heaters ensure adequate ventilation to avoid carbon monoxide poisoning).
- Monitor yourself and others for changes in physical and mental condition.
- Use the buddy system or supervision to ensure constant protective observation.
- If heavy work must be done, resulting in sweating/wet clothing, take rest periods in heated shelters and change into dry clothing as necessary.
- New employees should not work full-time in the cold during the first days of employment until they become accustomed to the working conditions and the use of required protective clothing.
- Include the weight and bulkiness of clothing in estimating the required work performance and weights to be lifted by the worker.
- Arrange the work in such a way that sitting or standing still for long periods is minimized.
- Perform work protected from drafts to the greatest extent possible. If possible, shield the work area from wind.
- Instruct workers in safety and health procedures. The training program should include, as a minimum, instruction in:
  - Signs and symptoms of frostbite, impending hypothermia, or excessive cooling of the body
  - Proper use of clothing
  - Proper eating and drinking habits
  - Safe work practices
  - Proper rewarming procedures and appropriate first aid treatment
- Tables 1 and 2 should be consulted to adjust working schedules for wind chill conditions based on equivalent chill temperature (ECT). These tables are guidelines only; ambient temperatures and wind conditions should be monitored frequently and work schedules adjusted as required. If workers show signs or symptoms of cold stress, the work schedule must be adjusted, as required.



## Work/Warming Regimen

Work should be performed in the warmest part of the day. If work is performed continuously in the cold or winter conditions or where rain or cool winds are expected, provide heated warming shelters, tents, cabins, or break rooms nearby. Encourage workers to use the shelter at regular intervals depending on the severity of the cold exposure. Table 2, Cold Work/Warmup Schedule for 4-Hour Shifts, provides guidance for working in severe cold weather. The onset of heavy shivering, the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter. Pain, numbness, or tingling in the extremities are indications for immediate return to the shelter. When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit sweat evaporation, or the worker should change into dry clothing. Never return to work in wet clothing.

**Table 1. Wind Chill Chart**

		Temperature (°F)																		
		Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Wind (mph)	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63	
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72	
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77	
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81	
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84	
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87	
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89	
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91	
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93	
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95	
	55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97	
	60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98	

Frostbite Times

30 minutes

10 minutes

5 minutes

Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V<sup>0.16</sup>) + 0.4275T(V<sup>0.16</sup>)

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

NWS/NOAA

**Table 2. Cold Work/Warmup Schedule for 4-Hour Shifts**

EQUIVALENT CHILL TEMPERATURE	MAXIMUM WORK PERIOD	NO. OF BREAKS
≥-24°F	Normal	1
-25° to -30°F	75 minutes	2
-31° to -35°F	55 minutes	3
-36° to -40°F	40 minutes	4
-41° to -45°F	30 minutes	5
≤-46°F	Stop work	Stop work

## **FLD 24 AERIAL LIFTS/MANLIFTS**

### **REFERENCES**

29 CFR 1926 Construction  
EM 385-1-1 US Army Corps of Engineers Safety and Health Requirements Manual  
ANSI A92.2 American National Standard Vehicle-Mounted Elevating and Rotating Aerial Devices

### **RELATED FLDs**

*FLD 22 – Heavy Equipment Operation*  
*FLD 23 – Cranes, Rigging, and Slings*  
*FLD 25 – Working at Elevation/Fall Protection*

### **PROCEDURE**

Aerial lifts include the following types of vehicle-mounted aerial devices used to elevate personnel to job-site above the ground.

- Extensible boom platforms
- Aerial ladders
- Articulating boom platforms
- Vertical towers

Although aerial lifts may be “field modified” for uses other than those intended by the manufacturer, it is Weston Solutions, Inc. policy that no modification shall be made on any aerial lift. Aerial lifts, including those listed above or combinations thereof, must be used in conformance with OSHA 29 CFR 1926.556, ANSI Standard A92.2, and manufacturer specifications and instructions.

- Electrical systems must be tested according to Section 5 of ANSI Standard A92.2.
- Critical hydraulic lines (line whose failure could result in a free fall) must have bursting capacities four times the normal use pressure. Non-critical lines must have 2:1 bursting factors.
- Aerial lifts must be equipped with backup safety devices to prevent free descent if power supply systems or primary suspension systems fail.
- Secondary controls that can override the platform controls and emergency descent must also be provided in case of a failure of the primary systems.
- Mechanical power transmission apparatus must be appropriately guarded and guards kept in place
- Boom and basket load limits specified by the manufacturer shall not be exceeded.

Aerial lifts must be maintained in safe operating condition at all times. Daily recorded inspections must be made to ensure welds are not cracked, lifting cables or chains are sound, hydraulic lines are tight and not leaking, control lines and cables are sound, electrical connections are tight, and tires are sound.

Required daily testing for safe operation of lift controls must be recorded.

Only authorized persons shall operate an aerial lift. The operator must be trained, completely familiar with the safety and operating instructions prior to use.

- A full body harness shall be worn with a shock absorbing lanyard attached to a secure point on the boom or basket when working from an aerial lift. Belting off to an adjacent pole, structure, or equipment while working from an aerial lift shall not be permitted. Operators shall be trained in the full wear of fall protection personal protective equipment (PPE). PPE shall be inspected daily.
- Employee shall always stand firmly on the floor of the basket, and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position. Aerial lifts shall not be used to raise or lower non-personal equipment.
- When working near energized lines or equipment, aerial lifts trucks shall be grounded or barricaded and considered as energized equipment, or the aerial lift truck shall be insulated for the work being performed.
- For lines rated 50 kV, or below, minimum clearance between the lines and any part of the man lift/aerial lift or load shall be 10 feet. WESTON guidance recommends using a safety factor of 2, increasing the clearance to 20 feet to maximize personnel safety.
- A manual of inspection and operation must be kept with the lift or be immediately available and must contain instructions for use as well as clearly indicating capacity, height limits, restrictions, warnings, and cautions.
- A statement of insulation must be prominently displayed on the unit. The insulated portion of an aerial lift shall not be altered in any manner that might reduce its insulating value.
- Posted on the machine must be the name and address of the manufacturer, listing acceptable alterations or alternative operating procedures and a notice to operators to read and thoroughly understand operating instructions before use.
- Equipment or material shall not be passed between a pole or structure and an aerial lift while an employee is working from the basket and is within the reaching distance of energized conductors or equipment that is not covered with insulating protective equipment.
- Articulating boom and extensible boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls. Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for overriding the upper controls. Controls shall be plainly marked as to their function. Lower controls shall not be operated unless permission has been obtained from the employee in the lift, except in the case of an emergency.

A backup alarm which emits an audible alarm will be utilized when the machine is moved in the reverse direction. The alarm must be heard above the surrounding noise. If the machine is not equipped with a backup alarm a spotter will be utilized.

Prior to moving over a highway or traveling where overhead utility lines or obstructions may be present, ladders, platforms or towers must be locked in the down position.

- When moving with the boom up, an inspection must be made of the entire route of the move to ensure there are no obstructions, overhead utilities, underpasses, or ground/terrain conditions that would prohibit a safe move.
- The operator/driver must have an unobstructed view of the path of travel and must maintain a safe speed.
- A recorded inspection must be made to ensure proper cradling of ladders, booms, platforms or towers, and stowage of outriggers.



## **FLD 25 WORKING AT ELEVATION/FALL PROTECTION**

This procedure establishes the minimum requirements for elevated work/fall prevention for WESTON operations.

Requirements listed in this procedure are not all-inclusive; each specific work location must be evaluated to ensure that workers are offered practical and effective means to assure safe elevated work.

All activities, including steel erection and sheet piling must incorporate appropriate fall protection at elevations of 6 feet or more\*. Options to reduce exposures to fall hazards can be managed by reducing the number of workers exposed, relocating equipment/work areas, use of a positioning device, or by choosing different equipment options (i.e., choosing an aerial lift rather than a ladder or a scaffold) and must be evaluated.

Fall protection is required for those workers conducting inspection, investigation, or assessment of fall hazards during construction activities. It is realized that the provision of fall protection for the first person up for establishing anchorages only would be difficult. In this situation, fall protection may not be required. After anchorages are installed, fall protection is required.

WESTON will take every reasonable precaution to protect the health and safety of our employees. Implicit in this policy is the requirement that employees use effective fall protection systems when working in any situation that presents a known or foreseeable fall exposure.

While this operating practice combines elements of OSHA and the Corps of Engineers EM 385-1-1 not all aspects of each are completely covered, therefore, those personnel writing and reviewing plans containing fall protection elements must be familiar with the appropriate regulations and/or agency requirements and act appropriately.

\*Employees performing work under General Industry Standards (29CFR1910) must provide protection at 4 feet. Workers must be provided protection where there is a possibility of a fall from any height onto dangerous equipment, into a hazardous environment, or onto an impalement hazard.

### **REFERENCES**

29 CFR 1910 Subpart D, *Walking-Working Surfaces*  
29 CFR 1926 Subpart M, *Fall Protection*; Subpart L, *Scaffolds*

EM 385-1-1, Corps of Engineers Safety and Health Requirements Manual (15 September 2008), Section 21, *Fall Protection*

*ANSI/ASSE Z.359-2007; Fall Protection Code*

Related FLDs:

*FLD 24 Aerial Lifts*

*FLD 26 Ladders*

*FLD 27 Scaffolding*

## **RESPONSIBILITY**

WESTON will assure that adequate and timely resources are available to support this fall protection program. To this end:

The Corporate Environmental Health and Safety Director will serve as (or directly appoint) the Program Administrator with responsibilities for developing implementing, monitoring and evaluating WESTON's Fall Protection Program.

Local Management (Division Manager, Client Services Manager, Project Manager, and Site Manager) is responsible for ensuring that fall protection programs and procedures are implemented and followed within their areas of responsibility.

The Corporate Environmental Health and Safety Director designates the Division Environmental Health and Safety Managers (DEHSM) to serve as Program Administrators and as (or directly appoint) Competent Persons for this Program. The DEHSM must be consulted during the planning phase for projects/sites where fall protection is determined to be infeasible as defined within this Field Operating Practice (FLD).

The function of Competent Persons in Fall Protection will be held by those employees who have completed WESTON's Fall Protection Competent Person training, or those named by the Program Administrator as having equivalent and accepted credentials. A Competent Person must be available at any location with fall hazards meeting the criteria outlined within this Program.

Employees must be trained and authorized to perform tasks with exposure to fall hazards as outlined within this Program.

Provisions for prompt rescue (both self-rescue and assisted rescue) must be evaluated and implemented prior to putting employees into situations with the risk of falling. The plan shall contain provisions for self-rescue and assisted rescue of any worker who falls including rescue equipment. If other methods of rescue are planned (e.g., by a jurisdictional public or Government emergency rescue agencies), it shall be indicated in the rescue plan including how to contact and summon agency to the mishap site.

## **GENERAL REQUIREMENTS**

Work performed at elevation where there is a risk of injury due to falls, will be performed in accordance with the following general requirements:

- Activities with potential fall hazards will be identified as part of the pre-job planning hazard assessment process. A Fall Hazard Plan will be developed and routinely evaluated as by a competent person as part of the site-specific health and safety plan (HASP).
- Fall hazards shall be identified and mitigated during the design or pre-planning phase on all new equipment and/or facility design (Safety through Design).
- The order of control measures (the hierarchy of controls) to abate fall hazards or to select and use a fall protection method to protect workers performing work at heights shall be:
  - Elimination: Remove the hazard from the work areas or change task, process, controls or other means to eliminate the need to work at heights and subsequent exposure to fall hazards (i.e. build roof trusses on ground level and then lift into place or design change by lowering a meter or valve at high locations to a worker's level;
  - Prevention (traditional or same-level barrier): Isolate and separate fall hazards from work areas by erecting same level barriers such as guardrails, walls, covers or parapets;

- Work platforms (movable or stationary): Use scaffolds, scissors lifts or aerial lift equipment to facilitate access to work location and protect workers from falling when performing work at high locations;
  - Personal Protective Systems and Equipment: Use of fall protection systems, including restraint, positioning or personal fall arrest, (i.e. requiring the use of full body harness, lanyard, and lifeline);
  - Administrative Controls: Introduce new work practices that reduce the risk of falling from heights, or to warn a person to avoid approaching a fall hazard (i.e. warning system, warning lines, audible alarms, signs or training or workers to recognize specific fall hazards).
- As available, exposure to fall hazards will be managed by reducing the number of workers exposed, relocating equipment/work area, or by choosing different equipment options (i.e., choosing an aerial lift rather than a ladder or scaffold).
  - Workers performing activities with fall hazards not mitigated by installation of standard guardrails, walls, or other barriers will be protected by the use of fall protection equipment or a WLS. When working between the leading edge and the WLS, fall protection equipment shall be used.
  - Equipment (aerial lifts, ladders, body harnesses, lanyards, etc.) shall be visually inspected by trained workers or the Field Safety Officer (FSO) prior to each use. Defective equipment shall be tagged, removed from service immediately, and the Site Manager notified.
  - Each employee performing construction work on a walking/working surface (horizontal and vertical) with an unprotected side or edge which is 6 feet (1.8m) or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems. Employees performing work under General Industry Standards (29CFR1910) must provide protection at 4 feet.
  - WESTON shall:
    - Review and approve selected fall protection equipment or alternative fall hazard control measures for unusual circumstances or for the use of fall protective equipment not previously approved
    - Perform periodic assessments of operations to evaluate performance and assure compliance with this FLD.
    - Provide technical guidance and regulatory interpretations to ensure consistent and compliant implementation of this program.
    - Provide comments on and communicate changes in fall prevention regulations.
    - Ensure an adequate supply of standard fall protection equipment is available for issue.
    - Ensure portable ladders and fall protection equipment are inspected prior to placing them in service.
    - In the event an employee falls, or some other related, serious incident occurs, (e.g., a near miss), investigate the circumstances of the fall or other incident to determine if the fall protection plan needs to be changed (e.g. new practices, procedures, or training) and implement those changes to prevent similar types of falls or incidents.

## **FALL PROTECTION SYSTEMS**

The following is not a comprehensive outline of fall protection methods for all fall hazard situations. The PM and FSO must evaluate each site and work activity for appropriate fall protection and worker safety requirements as outlined in OSHA 29 CFR 1910, 29 CFR1926, and ~~of~~ EM 385-1-1. WESTON's Program



Administrator and/or Competent Person(s) must be made aware of unique situations not fully covered by this FLD and/or listed regulatory reference.

## **PREVENTION**

### **Guardrails**

Top edge height of top rails, or equivalent guardrail system members, must be between 39 and 45 inches above the walking/working level, except when conditions warrant otherwise and all other criteria are met (e.g., when employees are using stilts, the top edge height of the top rail must be increased by an amount equal the height of the stilts).

Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structures, must be installed between the top edge and the walking/working surface when there is no wall or other structure at least 21 inches high.

- Midrails must be midway between the top edge of the guardrail system and the walking/working level.
- Screens and mesh must extend from the top rail to the walking/working level, and along the entire opening between rail supports.
- Intermediate members (such as balusters) between posts must be no more than 19 inches apart.
- Other structural members (such as additional midrails or architectural panels) must be installed so as to leave no openings wider than 19 inches.
- Guardrail systems must be capable of withstanding at least 200 pounds of force applied within 2 inches of the top edge, in any direction and at any point along the edge, and without causing the top edge of the guardrail to deflect downward to a height less than 39 inches above the walking/working level. In the event the guardrail system will be subject to heavy stresses from workers or equipment the system will be evaluated to determine if it must be reinforced beyond the minimum criteria.
- Midrails, screens, mesh, and other intermediate members must be capable of withstanding at least 150 pounds of force applied in any direction at any point along the midrail or other member.
- Top rails and midrails must not cause a projection hazard by overhanging the terminal posts.
- Guardrail systems shall be so surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.
- Steel banding and plastic banding shall not be used as top rails or midrails.
- Guardrail systems (Per 29 CFR 1926.500, Appendix A Guardrail construction must be to the standards listed below:
  - (1) For wood railings: Wood components shall be minimum 1500 lb-ft/in (2) fiber (stress grade) construction grade lumber. The posts shall be at least 2-inch by 4-inch (5 cm x 10 cm) lumber spaced not more than 8 feet (2.4 m) apart on centers. The top rail shall be at least 2-inch by 4-inch (5 cm x 10 cm) lumber; the intermediate rail shall be at least 1-inch by 6-inch (2.5 cm x 15 cm) lumber. All lumber dimensions are nominal sizes as provided by the American Softwood Lumber Standards, dated January 1970.

(2) For pipe railings: posts, top rails, and intermediate railings shall be at least one and one-half inches nominal diameter (schedule 40 pipe). Posts shall be at least 1 ½ in (3.8 cm) nominal diameter (schedule 40 steel pipe) spaced not more than 8 ft (2.4 m) on centers.

(3) For structural steel railings: posts, top rails, and intermediate rails shall be at least 2-inch by 2-inch (5 cm x 10 cm) by 3/8-inch (1.1 cm) angles, with posts spaced not more than 8 feet (2.4 m) apart on centers.

(4) For Steel Cable (Wire Rope) railings: Toprail and midrail shall be ¼-in (6.25 mm) steel cable, flagged every 6 ft (1.8 m) with high visibility material, and may be used only if tension is maintained to provide not more than 3 in (7.5 cm) deflection, in any direction from the center line, under a 200 lb (0.89 kN) load; Support posts shall be located to insure proper tension is maintained;

(5) Toe boards (Used to protect those below from falling objects).

(a) Toe boards shall be 3 ½ in (8.75 cm) in vertical height and shall be constructed from 1-in x 4-in (2.5-cm x 10.1-cm) lumber or the equivalent.

(b) Toe boards shall be securely fastened in place and have not more than ¼ in (0.6 cm) clearance above floor level.

(c) Toe boards shall be made of any substantial material, either solid or with openings not greater than 1 in (2.5 cm) in greatest dimension.

(d) Where material is piled to such a height that a standard toe board does not provide protection, paneling or screening from floor to toprail or midrail shall be provided.

## **POSITIONING DEVICE SYSTEMS**

These body harness systems are to be set-up so that workers can free fall no farther than 2 feet. They shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds, whichever is greater. Requirements for snaphooks, D-rings, and other connectors used with positioning device systems must meet the same criteria as those for personal fall arrest systems.

### **Personal Fall Arrest Systems**

A Personal Fall Arrest System (PFAS) must do the following:

- Limit maximum arresting force on an employee to 1,800 pounds when used with a body harness;
- Be rigged so that an employee can neither free-fall more than 6 feet nor contact any lower level;
- Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet and
- Have sufficient strength to withstand twice the potential impact energy of an employee free-falling a distance of 6 feet or the free-fall distance permitted by the system, whichever is less.

- PFAS are generally only certified for users within the capacity range of 130 to 310 lbs (59 to 140.6 kg) including the weight of the worker, equipment and tools. Workers shall not be permitted to exceed the 310 lbs (140.6 kg) limit unless permitted in writing by the manufacturer. For workers with body weight less than 130 lbs (59 kg), a specially designed harness and also a specially designed energy absorbing lanyard shall be utilized which will properly deploy if this person were to fall.

Key components of the PFAS must be in place and properly used to provide maximum worker protection. Each of the following pieces of the PFAS must meet the requirements of ANSI Z359.1-2007.

#### Anchor Point

- Anchor Point or Anchorage: Commonly referred to as a tie-off point. Anchorages must be capable of supporting 5,000 pounds of force per worker or designed with a safety factor of 2.

#### Harnesses

The personal protective equipment worn by the worker (i.e., full-body harness)

- The only form of body wear acceptable for fall arrest is the full-body harness.
- Should be selected based on work to be performed and the work environment.

#### Connecting Device

Connecting Device: The critical link which joins the harness to the anchorage/anchorage connector (e.g., shock-absorbing lanyard, fall limiter, self-retracting lifeline, rope grab). The connecting device includes the hardware (e.g., snaphooks, carabiners, D-rings, etc.) associated with both the connecting device and the harness.

- Potential fall distance must be calculated to determine type of connecting device to be used.

#### **Construction and Use**

##### Safety Harnesses, Lanyards, and Lifelines

- The construction of this equipment shall comply with requirements set forth in ANSI Z359.1, Safety Requirements for Personal Fall Arrest Systems, Subsystems, and Components for General Industry.
- Each belt and harness assembly shall bear identification marks that identify the manufacturer. The identification shall also bear the date of manufacture and "ANSI Z359.1-2007."
- Each belt, harness, lanyard, and lifeline assembly shall be visually inspected for defects prior to each use.
- Each belt and harness assembly shall be inspected, according to the manufacturer's recommendations by a competent person, other than the user, or at intervals of no more than semi-annually, ~~one year~~, whichever is less. Faulty equipment shall not be used and shall be tagged as defective or immediately destroyed.
- Body belts (safety belts) may only be used in conjunction with a restraint line to prevent a worker from reaching 6 feet from the edge of a roof/elevated platform. Body belts shall not be used as part of a fall arrest system.
- Personal fall protection equipment (harnesses, lanyard, lifelines, etc.) subjected to an arresting fall or a shock load shall not be reused.



- Fall arrest systems shall be tested as complete systems. Only components that are fully compatible with one another shall be used together.
- Anchorage used for attachment of personal fall arrest equipment shall be capable of supporting at least 5,000 pounds per worker attached. Anchorage for suspended platforms (Boatswain chair, two point suspended scaffold, etc.) shall be independent of any anchorage being used to support or suspend the platform from which work is being performed.
- Anchorage points for positioning devices which automatically limit free fall distances to 2 feet or less shall be capable of supporting at least twice the potential impact load of a worker's fall or 3000 pounds, whichever is greater. A positioning system shall not be used as a primary fall arrest system. Positioning systems use some of the same equipment as a fall protection system (such as a harness), however a positioning system used alone does not constitute fall protection. While positioning (working with both hands free), a person is exposed to a fall hazard and is required under this section to use a separate system that provides backup protection from a fall.
- Self-retracting lifelines and lanyards that automatically limit free fall distance to 2 feet or less shall be capable of sustaining a minimum tensile load of 3,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.
- Self-retracting lifelines and lanyards that do not limit free fall distance to 2 feet or less, ripstitch lanyards, and tearing and deforming lanyards shall be capable of sustaining a minimum tensile load of 5,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.
- Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses shall be made of synthetic fibers.
- Lanyards and vertical lifelines must have a minimum breaking strength of 5,000 pounds. .

### Connectors

Connectors, including D-rings and snaphooks, must be made from drop-forged, pressed or formed steel or equivalent materials. They must have a corrosion-resistant finish, with smooth surfaces and edges to prevent damage to connecting parts of the system.

Snaphooks and carabiners must meet the requirements of ANSI/ASSE Z359.1-2007.

D-Rings must have a minimum tensile strength of 5,000 pounds, and be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or becoming permanently deformed.

Snaphooks must have a minimum tensile strength of 5,000 pounds, and be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or becoming permanently deformed. They must also be locking-type, double-locking, designed and used to prevent disengagement.

Unless it is designed for the following connections, snaphooks must not be engaged:

- Directly to webbing, rope, or wire.
- To each other.
- To a D-ring to which another snaphook or other connector is attached.

## **Safety Nets**

Safety nets must be installed as close as practicable under the walking/working surface on which employees are working and never more than 30 25 feet below such levels. Defective nets shall not be used. Safety nets shall be inspected at least once a week for wear, damage, and other deterioration. The maximum size of each safety net mesh opening shall not exceed 36 square inches nor be longer than 6 inches on any side, and the openings, measured center-to-center, of mesh ropes or webbing, shall not exceed 6 inches. All mesh crossings shall be secured to prevent enlargement of the mesh opening. Each safety net or section shall have a border rope for webbing with a minimum breaking strength of 5,000 pounds. Connections between safety net panels shall be as strong as integral net components and be spaced no more than 6 inches apart.

Safety nets and safety net installations shall be tested in the suspended position immediately after installation under the supervision of Qualified Person [and in the presence of the Government Designated Authority (GDA) when working on a site subject to EM 385-1-1] and before being used as a fall protection system; whenever relocated, after major repair; and when left at one location, at not more than 6 month intervals.

The test shall consist of dropping into the net a 400 lb (180 kg) bag of sand, not more than 30 in +/- 2 in (76.2 cm +/- 5 cm) in diameter, at least 42 in (106.6 cm) above the highest working/walking surface at which workers are exposed to fall hazards. Means must be taken to ensure the weight can be safely retrieved after the test is conducted.

Shackles and hooks used in safety net installations shall be made of forged steel. When used with safety nets, debris nets shall be secured on top of the safety net but shall not compromise the design, construction, or performance of the safety nets. Materials, scrap pieces, equipment, and tools that have fallen into the safety net shall be removed as soon as possible and at least before the next work shift. Safety nets shall be protected from sparks and hot slag resulting from welding and cutting operations.

Safety nets shall be installed in accordance with 29 CFR 1926 Subpart M and EM 385-1-1 Section 21.G and Table 21-1, using the most restrictive regulation for safety of the worker.

## **Horizontal Life Lines (HLL)**

The HLL system must meet the requirements of OSHA 29 CFR 1926.502(d)(8) and EM 385-1-1, Section 21.H.05.d.(6) Lifelines

Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

A HLL is a fall arrest system consisting of flexible wire, rope or synthetic cable, spanned horizontally between two end anchorages. It may include in-line energy absorber, lifeline tensioner, turnbuckles or intermediate anchorages.

Locally manufactured HLLs are not acceptable.

Off-the-shelf commercial HLLs shall be installed, and used, under the supervision of a Qualified Person for fall protection only, as part of a complete fall arrest system that maintains a factor of safety of at least two. The design shall include drawings, required clearance, instructions on proper installation, and use procedures and inspection requirements.

**A Qualified person is a person with a recognized degree or professional certificate and with extensive knowledge, training, and experience in the HLL systems who is capable of designing, analyzing, evaluating and specifying HLL systems.**

## **ACTIVITIES AND SYSTEMS**

### **Hoist Areas**

Each employee in a hoist area shall be protected from falling 6 feet or more by guardrail systems or personal fall arrest systems. Guardrails at hoist areas will extend a minimum of 4 feet on each side of the access area/opening. If guardrail systems (or chain gate or guardrail) or portions thereof must be removed to facilitate hoisting operations, as during the landing of materials, and a worker must lean through the access opening or out over the edge of the access opening to receive or guide equipment and materials, that employee must be protected by a personal fall arrest system.

### **Holes**

Personal fall arrest systems, covers, or guardrail systems shall be erected around holes (including skylights) that are more than 6 feet above lower levels. All holes (defined as any opening 2 or more inches in its least dimension) must be evaluated for falling through or tripping hazards no matter what the fall distance to lower levels is.

### **Excavations**

If the edge of the excavation is obscured, each employee at the edge of an excavation 6 feet or more deep shall be protected from falling by guardrail systems, fences, barricades, or covers. Where walkways are provided to permit employees to cross over excavations, guardrails are required on the walkway if it is 6 feet or more above the excavation.

### **Leading Edges**

Each employee who is constructing a leading edge 6 feet or more above lower levels shall be protected by guardrail systems, safety net systems, or personal fall arrest systems. If WESTON can demonstrate that it is infeasible or creates a greater hazard to implement these systems, WESTON must develop and implement a fall protection plan that meets the requirements of 29 CFR 1926.502(k).

### **Low Slope Roofs**

Each employee engaged in roofing activities on low-sloped roofs, with unprotected sides and edges 6 feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or a combination of warning line systems and guardrail systems, or a warning line system and safety net

- The use of a Safety Monitoring System (SMS) by itself as a fall protection method is prohibited. This is defined as a safety system where a competent person for fall protection is responsible for recognizing and warning employees of fall hazards. SMS may only be used in conjunction with other fall protection systems.

## Warning Line Systems

Warning line systems consist of ropes, wires, or chains, and supporting stanchions. Minimal requirements include:

- A WLS shall consist of wires, rope or chains 34-39 in (0.9-1.0 m) high with supporting stanchions. WLS shall be flagged at not more than 6-foot (1.8 m) intervals with high-visibility material.
- The wire, rope or chains shall have a minimum tensile strength of 500 lbs (2.2 kN) and after being attached to the stanchions shall be capable of supporting without bracing, the loads applied to the stanchions.
- Stanchions shall be capable of resisting without tipping a force of 16 lbs (71 N) applied horizontally against the stanchions 30 in (76.2 cm) above the walking/working surface, perpendicular to the warning line and in the direction of the roof floor or platform edge. The line consisting of wire rope or chains shall be attached at each stanchion in such a way that the pulling on one section of the line will not result in a slack being taken up in adjacent sections before the stanchion tips over.
- Working within the WLS does not require fall protection. No worker shall be allowed in the area between the roof or floor edge and the WLS without fall protection. Fall protection is required when working outside the line.
- For roofing work the WLS shall be erected not less than 6 ft (1.8 m) from the roof edge. For other work (i.e. use of mechanical equipment) the WLS shall be erected not less than 15 ft (4.5 m) from the edge of the roof.
- Mechanical equipment on roofs shall be used or stored only in areas where workers are protected by a WLS, guardrail or PFAS.

Warning lines shall be erected around all sides of roof work areas. When mechanical equipment is being used, the warning line shall be erected not less than 6 feet from the roof edge parallel to the direction of mechanical equipment operation, and not less than 10 feet from the roof edge perpendicular to the direction of mechanical equipment operation.

When mechanical equipment is not being used, the warning line must be erected not less than 6 feet from the roof edge.

## Ladders

Ladders will be used in accordance with FLD 26, *Ladders*.

## Scaffolds

Scaffolds will be constructed, erected, and used in accordance with FLD 27, *Scaffolding*.

## RESCUE

Provisions for prompt and safe rescue after a worker has fallen and remains at elevation or suspended must be evaluated and in-place before putting employees at risk of falling. **Prompt rescue (typically defined as response and communication within 6 minutes)** must be part of the planning and plans for the site or activity. Rescue procedures and equipment will meet the requirements outlined in ANSI/ASSE Z359.2 and Z359.4. The buddy system (e.g., spotter) is required whenever employees are in fall protection and exposed to fall hazards. The spotter must immediately call for assistance in the event of a fall.



**As safety allows, the best option for rescue is employee self-rescue. The employee's physical and mental state must be taken into consideration before allowing this option.**

On-site rescue can be performed by trained employees. This rescue is typically conducted by means such as the use of ladders, aerial lifts, self-contained rope systems or other retrieval devices. On-site rescuers must work under the requirements of a site-specific written plan, are trained by a competent person with appropriate skills in the technique(s) chosen, and have practiced the specific procedure(s) chosen. The use of outside rescue agencies (e.g., fire departments, technical rescue groups) will require advance planning and communication. The Safety Plan for fall protection activities will document the agency chosen, how to contact them and agreements established.

Rescue provisions chosen for the site or activity must document agreements above, the type equipment needed, techniques and medical provisions for suspension trauma and other injury potential, as well as off-site ambulance/medical assistance.

## **TRAINING**

- Workers performing elevated work shall receive site-specific training by a competent person.
- For this Program, Competent Persons in Fall Protection are identified as those employees who have completed WESTON's Fall Protection Competent Person training, or those named by the Program Administrator as having equivalent and accepted credentials.
- Workers required to use personal protective equipment will be instructed on its proper use and limitations and demonstrate proficiency.
- Retraining shall be conducted at a minimum every 2 years and/or when:
  - Changes in the workplace render previous training obsolete;
  - Changes in the types of fall protection systems or equipment to be used render previous training obsolete; or
  - Inadequacies in an affected worker's knowledge or use of fall protection systems or equipment indicate that the worker has not retained the necessary understanding or skill.
- Supervisors (PMs and/or SMs) must be able to recognize hazards of elevated work and understand the procedures to be followed to minimize these hazards.
- At least one named Competent Person must be on-site during any work involving potential falls from elevation. Competent Person training requires an initial course (prior to site activities) and refresher training on a minimum 2 year basis.
- Weston's Fall Protection Program Trainers (e.g., Program Administrator, DEHSM) who provide WESTON's Fall Protection Competent Person training must meet the criteria outlined in ANSI/ASSE Z359.2-2007, Section 3.3.8, specifically:
  - Documented experience, knowledge, training and education equal to, or greater than the level they are instructing.
  - Documented experience, knowledge and skills in adult education methods.
  - Proof on on-going training with minimal annual equivalents to 1.6 CEUs relating to fall protection and rescue.

A written certification record shall be prepared with the name of workers trained, the date(s) of training, and the signature of the person who conducted the training. This written certification record shall be forwarded to the WESTON Safety Officer responsible for that project.

## **RECORDS/INSPECTIONS**

Fall protection hazard assessments (e.g., AHAs), site safety plans, equipment inspection forms, and employee training information will be maintained in accordance with WESTON requirements at the site or project office.

Employee training records will additionally be maintained through the EHS Track System.

All fall protection equipment shall be inspected daily before each use by the user and periodically in accordance with the equipment manufactures requirements. In all cases fall protection equipment must be inspected at least annually by a competent person, other than the user.

## **FLD 26 LADDERS**

### **REFERENCES**

ANSI A-14.1, A-14.2, A-14.3  
29 CFR 1910.25, 1910.16, 1910.27

### **RELATED FLDs**

*FLD 25 – Working at Elevation/Fall Protection*

#### **Portable Ladders**

Portable ladders must be used for their designed purpose only. Portable ladders must be used, maintained, and constructed according to American National Standards Institute (ANSI) Standards A-14.1 and A-14.2, Occupational Safety and Health Administration (OSHA) 29 CFR 1910.25 and .26 and manufacturer's instructions.

#### Inspection

Portable ladders must be examined for defects prior to use. Examination shall include, but not be limited to, ensuring that:

1. Joints between steps or rungs are tight.
2. Hardware and fittings are secure, and rivets are not sheared.
3. Metal bearings (e.g., locks, wheels, pulleys) are lubricated.
4. Rope on extension ladders is in good condition.
5. Rungs are not loose, cracked, bent, or dented; are free of splinters or splinters; and are treated to prevent slipping.
6. Side rails are not cracked, bent, or dented and are free of splinters.

**Note: defective ladders must not be used.** Ladders found to be defective should be clearly tagged to indicate NO USE, if repairable, or destroyed immediately if repair is not possible.

#### Use Requirements

Ladders must be set on a flat, firm surface with both handrails in contact with an upper support which is sufficiently strong and rigid.

Straight ladders must have secure footing provided by a combination of safety feet, top of ladder tie-offs and mud sills, or a person holding the ladder to prevent slipping.

When middle or top sections of sectional ladders are used as bottom sections, they must have safety feet.

The ratio of the distance to the foot of a ladder from the base of the vertical plane to the height from the base to the top of the vertical plane when the ladder rests on the top of the vertical plane shall be no more than 1:4 and no less than 1:3 (e.g., 1 foot out from a wall for every 4 feet up the wall to the point where the ladder rests against the wall).

The handrails of a straight ladder must extend at least 36 inches above the landing.

Straight ladders may not be lashed together to make sectional ladders.

Metal ladders must not be used near electrical conductors.

Workers must use both hands, and must face the ladder when ascending and descending.

No more than one person may use a straight portable ladder at a time.

Standing on the top rung/step or above the manufacturer's safe indication is prohibited.

Ladders should be positioned so workers do not have to lean more than half of their body beyond (outside of) either handrail.

Ladders must not be placed in front of doors that open toward the ladder unless the door is locked and the person(s) using the ladder has the key, the door is blocked open and other persons are warned of the presence of the ladder, or a guard is posted at the door.

Ladders must be inspected after each use and if acceptable, stored in a manner not to damage or stress the ladder. Ideally, ladders should be hung from a side rail in an area where sunlight or extremes in temperature or humidity will not affect them.

Ladders must never be used as scaffolding, storage racks, or shelves. Requirements for construction of portable ladders include:

- Ladders must conform to construction criteria of ANSI Standards A-14.1 and A-14.2.
- Ladders must have at least 12 inches between side rails and should have 12 inches between rungs.
- Ladder length must not exceed 30 feet for single section ladders, 48 feet for two-section ladders, and 60 feet for ladders with more than two sections. The minimum overlap for extension ladders must be 36 inches for up to 36 feet, 48 inches for 36 to 48 feet, and 60 inches for up to 60 feet. There must be positive stops to ensure proper overlap.
- Metal ladders must be of sufficient strength and corrosion resistant.
- Steps or rungs of metal ladders must be treated to prevent slipping.

### **Fixed Ladders**

Fixed ladders shall be constructed and used in accordance with OSHA Standards, 29 CFR 1910.27, and ANSI Standard A-14.3.

#### **Requirements for Construction**

**Loading Requirements:** A minimum live load capacity of 200 lb. is concentrated at the points of maximum stress. Capacity must be increased in 200-lb increments for each additional person, based on the rate of use and potential for more than one person using a ladder or ladder section at the same time.

Weight of the ladder itself and appurtenances must be considered in designing the railings and fastenings.

Wooden ladders must meet design stress requirements of 29 CFR 1910.25.

**Feature Requirements:** Metal rungs must be a minimum of 3/4-inch in diameter, except where corrosive atmospheres exist. In corrosive atmospheres, metal rungs must be 1-inch minimum diameter or coated to



prevent corrosion. Wooden rungs must be a minimum of 1 inch in diameter. The distance between rungs, cleats, or steps must be no more than 12 inches. Rungs, cleats, or steps must be uniformly spaced throughout the length of the ladder.

The minimum clear width of rungs, cleats, or steps is 16 inches.

Rungs, cleats or steps, and side rails that may be used for handholds when climbing, must offer adequate gripping surface and be free of splinters, slivers or burrs, and substances that could cause slipping.

Ladders constructed of different metals, which could result in electrolytic action, must incorporate electrolytic protection. Ladders in atmospheres that could affect the integrity of the ladder must be treated to prevent corrosion or deterioration.

Fixed ladders (unless of sufficient height to use caging or a well construction as fall protection) must have as a minimum:

- 15 inches of clearance from the centerline of the rungs to each side.
- 30 to 36 inches from the rungs to any obstruction on the climbing side of the ladder.
- 7 inches between the rungs and any obstruction on the non-climbing side of the ladder.
- grab rails or extensions of side rails reaching a minimum of 40 inches above the landing.
- be oriented so that it is not necessary to step across more than 12 inches to a point of landing through or to the side of the ladder.

Ladders of greater than 20 feet must have cages or other approved fall protection devices. Where cages or wells are used for fall protection, the cage must begin no lower than 7 feet from the "ground" landing, but no higher than 8 feet. Ladders of more than 30 feet must have sections offset with side-accessed landings (minimum dimensions 24 inches wide by 30 inches long) located at least 4 feet below the top of a 30-foot section (or fraction thereof). The distance from the rungs to the cage back on the climbing side must be between 27 and 28 inches, and the width of the cage or well no less than 27 inches. There should be no projections through the cage. Projections in wells may reduce space from rung to projection to no less than 24 inches, and projections must have deflectors for head protection.

Where fall protection is provided by ladder safety systems (body belts or harnesses, lanyards, and braking devices with safety lines or rails), systems must meet the requirements of and be used in accordance with FLD 25 and be compatible with construction of the ladder system.

## **FLD 38 HAND AND POWER HAND TOOLS**

### **REFERENCES**

29 CFR 1926 Subpart I

29 CFR 1910 Subpart P

ANSI Standard A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools

### **RELATED FLDs**

*FLD 06 – Cold Stress*

*FLD 10 – Manual Lifting and Handling of Heavy Objects*

*FLD 16 – Pressure Systems: Compressed Gas Systems*

*FLD 35 – Electrical Safety*

### **INTRODUCTION**

Injuries from hand tools are often caused by improper use, using the wrong tool for the job, or from using a defective tool. Workers often assume that they know how to use a common hand tool. Working with something other than the simplest non-powered hand tools shall be performed only by those persons competent or qualified through formal training or documented experience.

Like all tools, hand and power tools must be maintained properly for effective use and safety. This Field Operating Procedure describes general safety guidelines for the four major categories of hand tools: cutting tools, torsion tools, impact tools, and power tools.

The use of any machinery, tool, material, or equipment which is not in compliance with any applicable OSHA 1910/1926 requirement is prohibited. Any tools or equipment identified as unsafe or defective will be "tagged or locked-out." Controls shall be applied rendering the unsafe or defective tool or equipment inoperable. Any damaged or defective equipment shall be removed from its place of operation. Weston shall be responsible for the safe condition of tools and equipment used by employees, including tools and equipment that may be furnished by employees.

Tags shall be used as a means to prevent accidental injury or illness to employees who are exposed to hazardous or potentially hazardous conditions, equipment or operations, which are out of the ordinary, unexpected, or not readily apparent. Tags shall be used until the identified hazard is eliminated or the hazardous operation is completed. Tags need not be used where signs, guarding, or other positive means of protection are being used.

### **GENERAL SAFETY RULES – APPLICABLE TO USE OF ALL TOOLS**

- Tools will be inspected prior to each use. Tools found to be unsafe will be tagged by the inspector "Do Not Use" and either repaired or removed from the site.
- Keep the work area clear of clutter.
- Keep the work area properly illuminated.
- Maintain and keep tools sharpened, oiled, and stored in a safe, dry place.
- Wear ear and eye protection when cutting, sawing, drilling, or grinding.
- Supervisor should instruct everyone using equipment on safe procedures before they use them.
- Inspect tools, cords, and accessories regularly and document any repairs.

- Repair or replace problem equipment immediately.
- Electric power tools must have a 3-wire cord plugged into a grounded receptacle, be double-insulated or powered by a low-voltage isolation transformer, and fitted with guards and safety switches.
- Machine guards must be in-place and not removed during equipment operation.
- Do not alter factory-supplied safety features on tools.
- Install and repair equipment only if you are qualified.
- Use the right tool for the job; for instance, do not use a screwdriver as a chisel or a wrench as a hammer.
- Carry a sharp tool pointed downward or place in a tool belt or toolbox.
- Protect a sharp blade with a shield.
- Store tools in drawers or chests with cutting edge down.
- When using power tools, wear long hair in a protective manner, do not wear jewelry or loose clothing, use safety glasses, respiratory protection, hard hats, etc., as needed/specified by the manufacturer. Note that protective gloves should not be worn when operating powered woodworking tools because of the possibility of the work piece snagging the glove and pulling the hand to the cutting surface.
- All hand-held power-driven tools must be equipped with one of the following: a constant pressure switch that shuts off the power upon release (e.g., circular saws, hand-held power drills, chain saws) or an on-off switch (e.g., routers, planers scrolls saws, jigsaws).
- Never leave a running tool unattended.
- All workers using hand and power tools must be properly trained, and training must be documented.
- Tools of a non-sparking material must be used if fire/explosion hazards exist.
- All fuel-operated tools shall be stopped and allowed to cool prior to being refueled, serviced, or maintained, and proper ventilation provided when used in enclosed spaces.
- Bench grinders shall be properly grounded. Work rests must be kept at a distance not to exceed 1/8 inch from the grinding wheel surface.
- All persons using grinders or abrasive wheels shall use approved eye-protective devices.
- Hand held grinders shall have grinding wheel guards in place during operation.
- Train personnel to recognize that tasks involving lifting, repetitive motion, excess pressure, vibration, awkward positions, and remaining stationary for prolonged periods and work in cold conditions increase the risk of musculoskeletal injury. Procedures for avoiding or minimizing risk include: using mechanical devices for lifting, following procedures in FLD 10 when manual lifting is necessary, using shock absorbing gloves when using vibrating tools, choosing tools that reduce gripping force and align joints in a neutral position or holding tools in an ergonomically neutral position, taking breaks or alternating repetitive jobs, and following procedures in FLD 06.
- Hand tools such as chisels and punches, which develop mushroomed heads during use must be taken out of service and reconditioned by qualified persons or replaced, as necessary.
- Broken or fractured handles on hammers, axes and similar equipment must be replaced promptly.
- Worn or bent wrenches must be replaced.

- Handles designed for use on files and similar tools must be used.
- Jacks must be checked periodically to ensure they are in good operating condition

## **TORSION TOOLS**

Torsion tools are used to grip, fasten, and turn. These include wrenches, pliers, screwdrivers, vises, and clamps. There is a variety of each type of these tools. Selection is very important. Here are a few safety precautions for common torsion tools:

- Wrenches should always be pulled and not pushed. Pushing a wrench can cause a loss of control if there is a sudden release of pressure. A short, steady pull should be used rather than quick, jerky motions. Where available, use a socket wrench instead of an adjustable or open-ended wrench. Socket wrenches are generally easier to control, are more convenient, and are less likely to damage a bolt or nut. When using an adjustable wrench, the pressure should be applied to the fixed jaw
- Pipe wrenches can easily slip on pipes or fittings, causing injury. To prevent slipping, make sure that the pipe or fitting is clean and the wrench jaws are sharp and kept clean of oil and debris.
- Pliers should never be substituted for a wrench. They do not have the same gripping power and can easily slip on a tight object. When using cutting pliers, the object being cut can fly off and cause injury. Wear safety glasses when cutting with pliers.
- Screwdrivers are often misused. They should not be used for prying, or as punches or wedges. These misuses can damage the head of the screwdriver. A dull tip can cause the screwdriver to slip. The tip must be flat at the tip and tapered for a snug fit on the screw.
- When using vises, make sure that the vise is bolted solidly to a base (e.g., work bench). When cutting material in a vise, try to cut as close to the vise as possible to minimize vibration.
- Oil vises regularly.

## **Screwdrivers**

- Most screwdrivers are not designed to be used on electrical equipment. Use an insulated screwdriver.
- Do not hold an object in the palm of one hand and press a screwdriver into it; place the object on a bench or a table.
- Never hammer with a screwdriver.
- Check for broken handles, bent blade, etc.
- Select a screwdriver of the proper size to fit the screw.
- Screwdrivers with a split or splintered handle shall not be used.
- The point shall be kept in proper shape with a file or grinding wheel.
- Screwdrivers shall not be used as a substitute punch, chisel, nail-puller, etc.

## **Pliers**

- Do not use pliers as a substitute for hammers or wrenches.
- Use insulated pliers when doing electrical work.



- Inspect pliers frequently to make certain that they are free of breaks or cracks.
- Pliers shall be kept free from grease and oil and- the teeth or cutting edges shall be kept clean and sharp.
- The fulcrum pin, rivet or bolt shall be snug but not tight.

### **Wrenches**

- Select the correct size of wrench for the job.
- Never use a piece of pipe or another wrench as a wrench handle extension.
- Too much leverage can ruin a tool and cause injury.
- To avoid sudden slips, stand in a balanced position and always pull on the wrench instead of pushing against the fixed jaw.
- Only wrenches in good condition shall be used; a bent wrench, if straightened, has been weakened and shall not be used.
- Watch for sprung jaws on adjustable wrenches.
- Always pull toward yourself, never push, since it is easier to brace against a sudden lunge toward you should the tool slip or break.
- When using a wrench on a tight nut - first use some penetrating oil, use the largest wrench available that fits the nut, when possible pull on the wrench handle rather than pushing, and when possible apply force to the wrench with both hands while both feet are firmly placed. Always assume that you may lose your footing - check the place where you may fall for sharp objects.
- Keep all pipe wrenches clean and in good repair. The jaws of pipe wrenches should be wire brushed frequently to prevent an accumulation of dirt and grease that would otherwise build up and cause wrenches to slip.
- Never use pipe wrenches in place of a rod holding device.
- Replace hook and heel jaws when they become visibly worn.
- Position your hands so that your fingers will not be smashed between the wrench handle and the ground or other work surface; when breaking joints the wrench may slip or the joint may suddenly let go.

### **IMPACT TOOLS**

Impact tools include various types of hammers such as riveting hammers, carpenter's claw hammers, and sledgehammers. The main hazard associated with all these tools is damage to the hands and arms. The following safety procedures should be employed when using hammers:

- The handle shall be securely fitted and suited for the type of job and type of hammerhead. The striking face of the hammer shall be kept well dressed according to the application.
- The handle shall be smooth and free of oil to prevent slippage.
- Safety goggles shall be worn at all times when hammering to protect from flying nails, wood chips, and metal or plastic fragments.

- To properly drive a nail, hold the hammer near the end of the handle and start off with a light blow. Increase power after the nail is set.
- To avoid chipping or spalling of the hammerhead, use the lightest swing possible, hammer straight and not on an angle. Inspect the head of the hammer for potential chipping and spalling.

### **Hammers**

- Use the correct hammer for the type of work to be done.
- Have an unobstructed swing when using a hammer and watch for overhead interference.
- Check for defects before using.
- The head of a hammer shall be wedged securely and squarely on the handle and neither the head nor the handle shall be chipped or broken.

### **CUTTING TOOLS**

The main hazard associated with cutting tools is tool slippage. A dull tool or poor tool technique can cause a slip, which can redirect the cutting part of the tool toward the body. In addition, a sudden release or change in the force applied to a tool can throw the user off balance, possibly falling into another object, which may cause injury. To prevent slippage, tools shall be kept sharp and handled in such a way that, if a slip occurs, the direction of force will be away from the body. In addition, cutting along the grain of a material can help prevent changes in the pressure applied to the tool, thereby preventing slippage.

### **Chisels**

- Always wear safety goggles or a face shield when using a chisel.
- Drive wood chisel outward and away from your body.
- Do not use chisels to pry.
- Keep edges sharp for most effective work and protect when not in use.

### **Knives**

- Always cut away from the body.
- Keep hands and body clear of the knife stroke.
- Use a locking blade knife when possible.
- Keep blades sharp.
  - Knives and other sharp or edged tools must be maintained in proper condition. A sharp edged tool, used properly, is safer than a dull or improperly maintained tool.
  - When not in immediate use edged tools must be properly secured via, sheathing, closing, capping or covering.
  - Any task involving the use of an edged tool must be properly evaluated, alternatives to edged tools reviewed and training in the proper use, maintenance and handling verified by management and/or the site safety officer.
  - Knives, box cutters or like tools will not be authorized for cutting plastic wire ties or tubing. Use appropriately shaped and sized wire cutters or snips.
  - Remove knives from carry on luggage and place in checked baggage.

## **POWERED TOOLS**

- Portable power tools shall be carefully inspected before use and shall be kept repaired.
- Switches and plugs must operate properly, and the cords must be clean and free from defects.
- Portable powered tools capable of receiving guards and/or designed to accommodate guards shall be equipped with guards to prevent the operator from having any part of his body in the danger zone during the operating cycle.
- Electric powered portable tools with exposed conducting parts shall be grounded. Portable tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Where such an approved system is employed, the equipment shall be distinctively marked.
- Hand-held powered tools of a hazardous nature such as circular saws having a blade diameter greater than two inches, chain saws, percussion tools, drills, tappers, fasteners, drivers, grinders with wheels greater than two inches in diameter, disc sanders, belt sanders, reciprocating saws, saber scroll saws and jig saws with blade shanks greater than one-fourth inch, and other similarly operating powered tools shall be equipped with a constant pressure switch or control ("dead-man switch") that will shut the power off when the pressure is released.
- Portable circular saws having a blade diameter over two inches shall be equipped with guards or hoods which will automatically adjust themselves to the work when the saw is in use, so that none of the teeth are exposed to contact above the work. When withdrawn from the work, the guard shall completely cover the saw to at least the depth of the teeth. The saw shall not be used without a shoe or guide.
- Pneumatic powered portable tools shall be equipped with automatic air shut-off valves that stop the tool when the operators hand is no longer in contact with the tool. Safety clips, retainers, or other effective means shall be installed on pneumatic tools to prevent the tools from accidentally misfiring.
- Abrasive wheels with a diameter of more than two inches shall be used only on machines provided with safety guards. The guards shall cover the spindle end, nut, and flange projections. Guards on operations where the work provides a suitable measure of protection to the operator may be so constructed that the spindle end, nut, and other flanges are exposed.
- Explosive-actuated fastening tools' muzzle ends shall have a protective shield or guard designed to confine any flying fragments or particles. The tool shall be so designed that it cannot be fired unless it is equipped with a protective shield or guard. Weston Solutions, Inc. employees are not permitted to use a power-actuated tool until properly trained as prescribed by the manufacturer.

### **Extension Cords**

See FLD 35, Electric Safety, for requirements and procedures for using extension cords.

## **SPECIALTY TOOLS**

### **Pneumatic Powered Tools**

Tools powered by air must be inspected and maintained as described above. Hose or tubing used to deliver air to pneumatic tools must be used as required and according to procedures in FLD 16, Pressure Systems: Compressed Gas Systems.

## **Powder-Actuated Tools**

- Only employees who have been trained in the operation of the particular tool in use shall be allowed to operate a powder-actuated tool.
- Powder-actuated tools shall be tested each day before loading to see that safety devices are in proper working condition. The method of testing shall be in accordance with the manufacturer's recommended procedure.
- Any tool found not in proper working order, or that develops a defect during use, shall be immediately removed from service and not used until properly repaired.
- Personal protective equipment shall be selected in accordance with manufacturer's recommendations and in consideration of the potential hazards of the task.
- Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any employees. Hands shall be kept clear of the open barrel end.
- Loaded tools shall not be left unattended.
- Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile.
- Driving into materials easily penetrated shall be avoided unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.
- No fastener shall be driven into a spalled area caused by an unsatisfactory fastening.
- Tools shall not be used in an explosive or flammable atmosphere.
- All tools shall be used with the correct shield, guard, or attachment recommended by the manufacturer.
- Powder-actuated tools used by employees shall meet all other applicable requirements of American National Standards Institute, A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools.



## **FLD 49 SAFE STORAGE OF SAMPLES**

### **REFERENCE**

DOT Emergency Response Guide (ERG)

To ensure that multi-media samples collected in the course of WESTON work assignments are not stored in a manner that creates undue hazard to WESTON employees or others.

### **PROCEDURE**

Samples that are transported from a WESTON work location must be classified and packaged in compliance with U.S. Department of Transportation (DOT) regulations or alternatively in accordance with International Air Transport Association (IATA) regulations. WESTON's manual of Procedures for Shipping and Transporting Dangerous Goods must be consulted to determine if the samples will be classified as either "environmental" or "hazardous materials" samples.

#### **Environmental Samples**

Environmental samples are not subject to DOT or IATA dangerous goods regulations and must be packaged to protect their integrity during transportation and temporary storage and should have appropriate chain-of-custody documentation. These samples may be brought to a WESTON office location or rented space to verify sample documentation and repackaging (e.g., with ice or cold packs). Minor spill clean-up capability is required.

Once secured for shipment, these samples can be temporarily stored for the next day ground or air shipment pick-up. Under no circumstances are samples to be stored beyond the time necessary to arrange for transportation to a laboratory.

#### **Hazardous Materials Samples**

These samples are subject to DOT and/or IATA dangerous goods regulations and must be packaged and labeled according to the appropriate regulations, including completed chain-of-custody documentation prior to being transported from the WESTON work site. WESTON drivers must have the documentation for the samples and a DOT Emergency Response Guide (ERG) readily available in the vehicle. The ERG is available on-line at: <http://hazmat.dot.gov/pubs/erg/gydebook.htm> and appropriate sections can be copied to accompany samples being transported by vehicles driven by WESTON employees.

Under normal circumstances these samples should be shipped from the field and never brought back to a WESTON office location or into a rented space. If it is not possible to ship the samples from the field during the same day they are collected, a properly packaged, labeled, and sealed sample shipping container may be brought back to a WESTON office location for shipment to a laboratory the next business day - provided the temporary storage location is secure from access by any personnel who are not trained in shipping hazardous materials. Under no circumstances are samples to be stored in rented space; if necessary, secure temporary storage in a locked vehicle may be authorized. Note that some office leases do not permit the storage of hazardous materials and the lease will govern whether such materials can be stored overnight.

## **INSPECTION FOLLOW-UP**

Shipping procedures for samples should be included in the site-specific health and safety plan (HASP) and reviewed for compliance with these procedures prior to approval. EHS audits will include a review to sample shipping and storage procedures.